AKAI-00955

AKAI

GX-210D

SERVICEINFORMATION

GX-210D
THREE · MOTOR
AUTO REVERSE
PLAY
REC
RWD
F.FWD
PAUSE
TAPE SPEED
TAPE SELECTOR
REC LEVEL
REC
LEFT
RIGHT
MIN
MAX
MONITOR
TAPE
SOURCE
POWER
PHONE

STEREO TAPE DECK

MODEL GX-210D

SECTION 1 SERVICE MANUAL 3
SECTION 2 PARTS LIST 31
SECTION 3 SCHEMATIC DIAGRAM 56

RANK RADIO INTERNATIONAL A/s
Telegrafvej 4, 2750 Ballerup · Telefon 01 - 65 40 00

SECTION 1

SERVICE MANUAL

TABLE OF CONTENTS

I. SPECIFICATIONS **4**

II. MEASURING METHOD **6**

- 1. TAPE SPEED DEVIATION 6
- 2. WOW AND FLUTTER 6
- 3. FREQUENCY RESPONSE 6
- 4. SIGNAL TO NOISE RATIO 6
- 5. TOTAL HARMONIC DISTORTION FACTOR 7
- 6. CROSS TALK 7
- 7. ERASE RATIO 7

III. DISMANTLING OF UNIT **8**

IV. SYSTEM CONTROL CIRCUIT OPERATION **10**

- 1. STOP MODE 13
- 2. FORWARD PLAYBACK MODE 13
- 3. FROM FWD TO REV PLAYBACK, AND AT REV PLAYBACK MODE 14
- 4. FROM REVERSE TO FORWARD PLAYBACK 15
- 5. RECORDING MODE 15
- 6. FAST FORWARD AND REWIND MODE 15
- 7. MUTING OPERATION 15

V. MECHANISM ADJUSTMENTS **16**

- 1. REEL TABLE HEIGHT ADJUSTMENT 17
- 2. PINCH WHEEL PRESSURE MEASURING METHOD 17
- 3. BRAKE TENSION ADJUSTMENT 17
- 4. LEFT AND RIGHT REEL MOTOR TENSION AT VARIOUS OPERATING MODES 18
- 5. FLYWHEEL LOOSE PLAY ADJUSTMENT 18
- 6. FLYWHEEL BELT POSITION ADJUSTMENT 18

VI. HEAD ADJUSTMENTS **19**

- 1. HEAD HEIGHT ADJUSTMENT 19
- 2. HEAD AZIMUTH ALIGNMENT ADJUSTMENT 19

VII. AMPLIFIER ADJUSTMENTS **21**

- 1. PLAYBACK LEVEL ADJUSTMENTS 21
- 2. VU METER SENSITIVITY ADJUSTMENT 24
- 3. HIGH RANGE FREQUENCY DEVIATION CHECK 24
- 4. RECORDING LEVEL ADJUSTMENT 24
- 5. FREQUENCY RESPONSE ADJUSTMENT 25
- 6. RECORDING BIAS FREQUENCY MEASURING METHOD 25

VIII. D.C. RESISTANCE OF VARIOUS COIL **26**

IX. COMPOSITE VIEWS OF COMPONENTS **27**

I. SPECIFICATIONS

An asterisk next to a figure indicates the minimum guaranteed performance.

TRACK SYSTEM		4-track 2-channel stereo system
TAPE SPEED		7-1/2 ips (19 cm/sec.) ±0.8% 3-3/4 ips (9.5 cm/sec.) ±1%
WOW AND FLUTTER		Less than 0.08% (*0.12%) RMS at 7-1/2 ips Less than 0.12% (*0.25%) RMS at 3-3/4 ips
TOTAL WOW AND FLUTTER		Less than 0.18% RMS at 7-1/2 ips (SCOTCH #175 tape, 3,000 Hz recording and playback)
FREQUENCY RESPONSE	S.R.T. TAPE	30 to 25,000 Hz ±3 dB at 7-1/2 ips 40 to 20,000 Hz ±3 dB at 3-3/4 ips
	REGULAR TAPE	30 to 23,000 Hz ±3 dB at 7-1/2 ips 40 to 18,000 Hz ±3 dB at 3-3/4 ips
TOTAL DISTORTION FACTOR		Less than 1.5% *Less than 2% at 1,000 Hz 0 VU recording *Less than 3% at 1,000 Hz 0 VU recording
OUTPUTS	LINE OUTPUT	1.228V (4 ±1 dB) at FWD mode, using a 250 Hz 0 VU pre-recorded tape 1.228V (4 ±1.5 dB) at REV mode, using a 250 Hz 0 VU pre-recorded tape
	DIN OUTPUT	610 mV (−2 dB), using a 250 Hz 0 VU pre-recorded tape
INPUTS	MIC INPUT	More than 0.3 mV
	LINE INPUT	More than 60 mV
	DIN INPUT	More than 5 mV (Low) More than 60 mV (High)
RECORDING/PLAYBACK LEVEL		1.228V (4 ±1.5 dB) at 7-1/2 ips 1,000 Hz 0 VU recording
S/N RATIO		Better than 50 dB *Better than 50 dB at 7-1/2 ips *Better than 47 dB at 3-3/4 ips
TOTAL S/N RATIO		Better than 47 dB at 7-1/2 ips
CROSS TALK		Better than 45 dB *Better than 40 dB at 1,000 Hz, 3 VU recording
ERASE RATIO		Better than 70 dB
RECORDING BIAS FREQUENCY		102 kHz ±5%
BIAS LEAK		Less than −30 VU
HIGH FREQUENCY DEVIATION		
	Between FWD channels	Within 3 dB
	Between REV channels	Within 4 dB
	Between FWD-REV	Within 3.5 dB
REVERSING TIME		2 to 3 seconds
RECORDING CAPACITY		45 min. stereo recording, using a 1,800 ft. tape at 7-1/2 ips
F.FWD AND RWD TIME		110/90 sec., using a 1,800 ft. tape at 50/60 Hz
MOTORS	CAPSTAN MOTOR	2 speed Hysteresis Synchronous Motor Type: HM2-16MC (winterized) 4-8 pole Revolutions: 1,500/1,800 r.p.m. at 50/60 Hz 750/900 r.p.m. at 50/60 Hz
	REEL MOTOR	Two 6-pole eddy current outer rotor motor Type: 24XO-MR Revolutions: 930/1,120 r.p.m. at 50/60 Hz
HEADS	COMBO RECORDING/ERASE HEAD	Type: RE4-6 GX Head Gap: 3.5 to 5.5 microns (REC) 0.2 mm W Gap (Erase) Impedance: 1,400Ω ±25% at 100 kHz (REC) 130Ω ±7% at 100 kHz (Erase) D.C. Resistance: 5.5Ω (REC) 2.3Ω (Erase)
	PLAYBACK HEAD	Type: P4-202 GX Head Gap: 1.2 to 2.2 microns Impedance: 1,400Ω at 1,000 Hz D.C. Resistance: 268Ω

TRANSISTORS	2SC711(D) (E) (F) . . . 14	2SC1312(G) (H) . . . 14
	2SD360(D) . . . 1	
DIODES	1N34A . . . 4	1S2473VE . . . 4
	10D05 . . . 4	10D1 . . . 1
	10D2 . . . 1	WG713 . . . 1
ZENER DIODES	WZ240 . . . 1	YZ088 . . . 2
POWER SUPPLY	100 to 240V A.C. 50/60 Hz for Universal and WG models	
	120V A.C. 60 Hz for CSA models	
	220V A.C. 50 Hz for CEE models	
POWER CONSUMPTION	100W max.	
DIMENSIONS	371(H) x 368(W) x 227(D) mm	
	(14.6" x 14.5" x 8.9")	
WEIGHT	15.4 kg (33.9 lbs.)	

NOTE: Specifications subject to change without notice.

II. MEASURING METHOD

1. TAPE SPEED DEVIATION

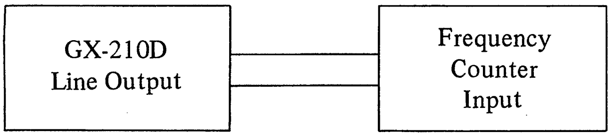

GX-210D
Line Output
Frequency
Counter
Input

Fig. 1

As shown in Fig. 1, connect a Frequency Counter to the Line Output. Playback a 1,000 Hz pre-recorded test tape. Take a frequency counter reading at the beginning, middle, and end of tape winding during playback. The maximum value of these respective readings will represent tape speed deviation.

2. WOW AND FLUTTER

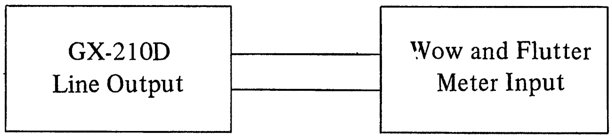

GX-210D
Line Output
Wow and Flutter
Meter Input

Fig. 2

Method A

As shown in Fig. 2, connect the Line output to the Input of a Wow and Flutter Meter. Playback a 3,000 Hz pre-recorded test tape and take a wow and flutter meter reading at the beginning, middle, and end of tape winding. The maximum value of these respective readings will represent the wow and flutter.

Method B

Supply a 3,000 Hz sine wave signal from an Audio Frequency Oscillator and make a recording on a blank tape at the beginning, middle, and end of tape winding. Rewind and playback the resultant signals. Measure wow and flutter with a Wow and Flutter Meter. (The wow and flutter value of Method B will be close to twice that of Method A.)

3. FREQUENCY RESPONSE

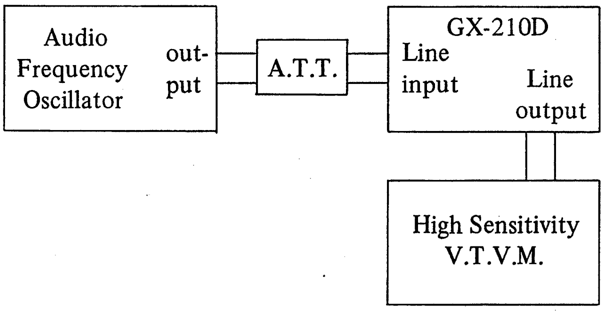

Audio
Frequency
Oscillator
out-
put
A.T.T.
GX-210D
Line
input
Line
output
High Sensitivity
V.T.V.M.

Fig. 3

For measuring frequency response, connect instruments as shown in Fig. 3 and proceed as follows:

1) Supply a 2,000 Hz sine wave signal to the Line input from an Audio Frequency Oscillator through an Attenuator.
2) Set tape deck to recording mode and turn recording level control volume to maximum. Adjust attenuator to obtain a +4 dB V.T.V.M. reading.
3) Under conditions described in 2) above, re-adjust attenuator so that the Line output is −16 dB, and record 30 to 23,000 Hz at 7-1/2 ips spot frequencies.
4) Rewind the tape and playback from the beginning. Take V.T.V.M. spot frequency readings and plot values on a graph.

NOTE: When measuring frequency response, new tape should be used.

4. SIGNAL TO NOISE RATIO

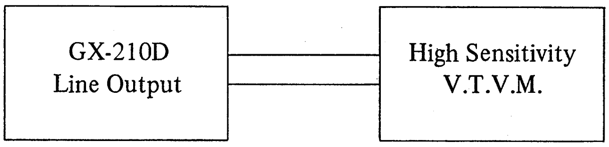

GX-210D
Line Output
High Sensitivity
V.T.V.M.

Fig. 4

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output. Playback a 250 Hz "0" VU pre-recorded test tape and measure the output. Then remove the tape and measure the noise level under the same condition. Convert each of the measured values into decibels.

5. TOTAL HARMONIC DISTORTION FACTOR

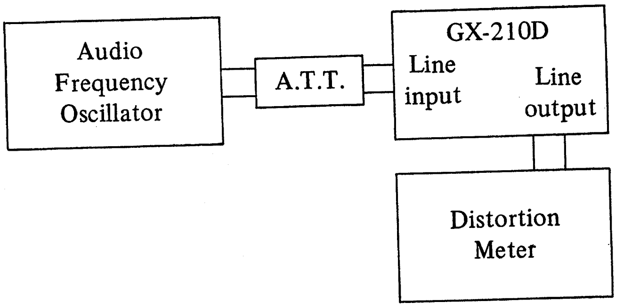


Fig. 5

Connect the measuring instruments as shown in Fig. 5 and record a 1,000 Hz sine wave signal at "0" VU. Playback the resultant signal and measure the overall distortion factor. Measure the noise level of the tape recorder without the tape. Connect the audio frequency oscillator directly to the distortion meter for measurement of the distortion factor of the oscillator. The required distortion factor can be obtained from the results of the above measurement by the following formula:

$$d_0 = d - d_1 - d_2$$

where, d_0 = Required distortion factor
d = Overall distortion factor
d_1 = Noise Level
d_2 = Distortion factor of the oscillator

NOTE: When measuring the distortion factor, new tape should be used.

6. CROSS TALK
(Cross talk between the channels)

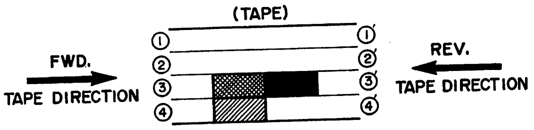


Fig. 6

As shown in Fig. 6, first record a 1,000 Hz sine wave signal on Track No. 3 at +3 VU level. Next, record under a non-input condition. Then, playback the tape on Tracks No. 3 and 4 (reversed condition of tape) through the B.P.F. (band pass filter, Sensitivity ... 1:1) and obtain a ratio between the two from the following formula:

$$C = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

where, C = Desired cross talk ratio (dB)
E_0 = 1,000 Hz signal output level ■
E_2 = 1,000 Hz cross talk level ▨
E_1 = Non-input signal recorded level ▩

7. ERASE RATIO

As shown in Fig. 4, connect a High Sensitivity V.T.V.M. to the Line output. Playback a virgin tape and take a V.T.V.M. reading of the output level. Next, record a 1,000 Hz sine wave signal at +3 VU, then playback this recorded signal and take a V.T.V.M. reading of the output level. Next, using this pre-recorded tape, record under a non-input condition and take a reading of the noise level output of the erased signal and obtain a ratio between the two from the following formula:

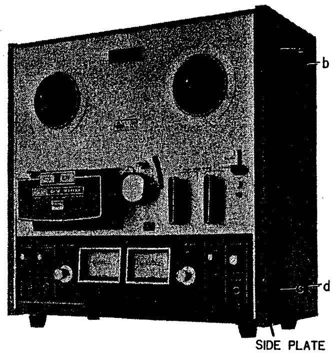
$$E_r = 20 \log \frac{E_0}{E_2 - E_1} \text{ (dB)}$$

where, E_r = Desired erase ratio (dB)
E_0 = 1,000 Hz signal output level
E_2 = Non-input signal recorded level
E_1 = Virgin tape noise output level

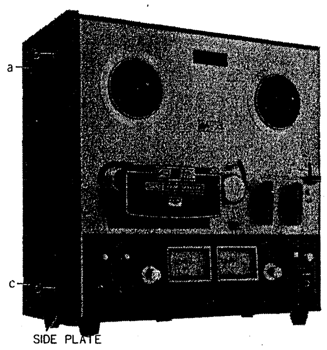
III. DISMANTLING OF UNIT

In case of trouble, etc. necessitating disassembly, please disassemble in the order shown in photographs. Reassemble in reverse order.

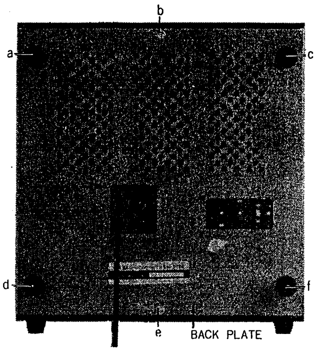
1


b
d
SIDE PLATE

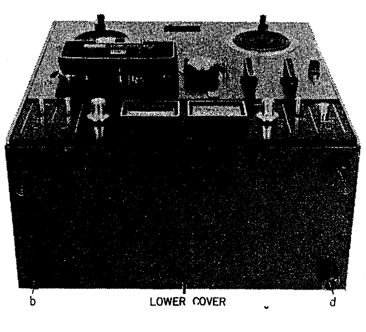
2


a
c
SIDE PLATE

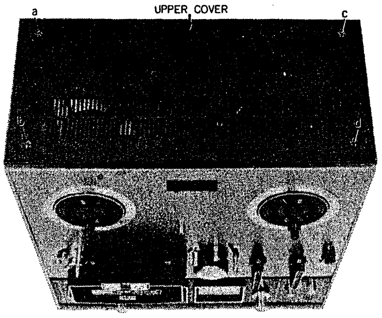
3


b
a
c
d
f
e
BACK PLATE

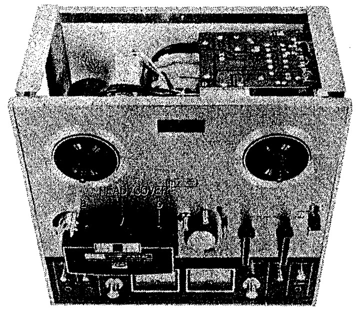
4


b
LOWER COVER
d

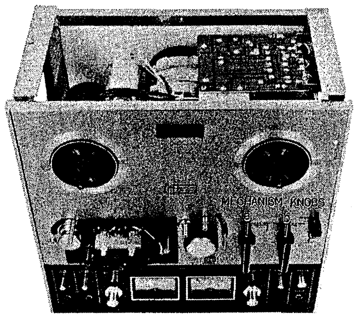
5


a
UPPER COVER
c

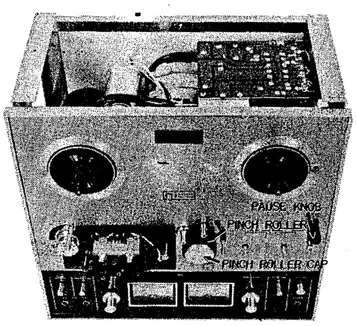
6



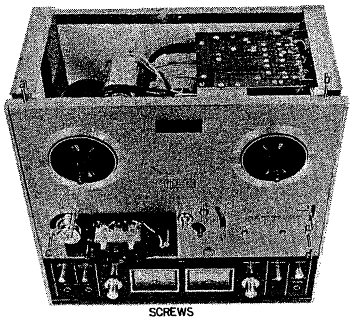
7


MECHANISM KNOBS

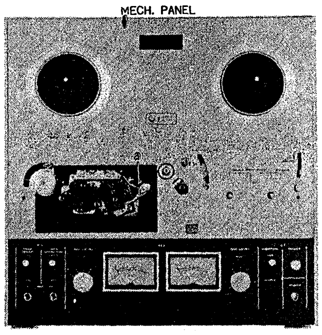
8


PAUSE KNOB
PINCH ROLLER
PINCH ROLLER CAP

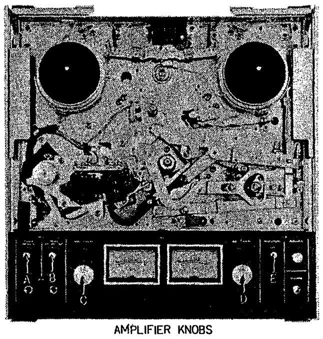
9



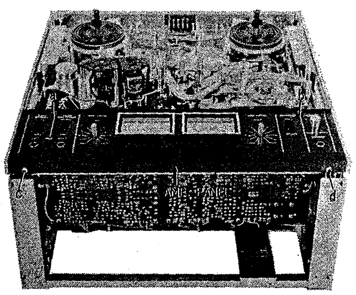
10


MECH. PANEL
a

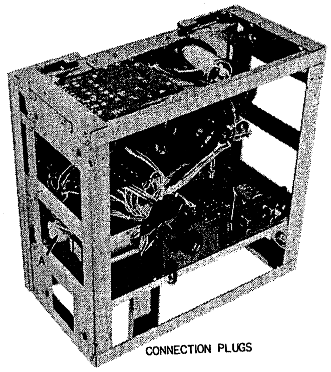
11


A
B
C
D
E
AMPLIFIER KNOBS

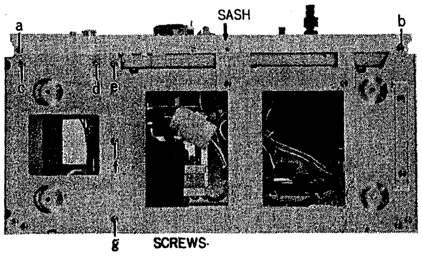
12



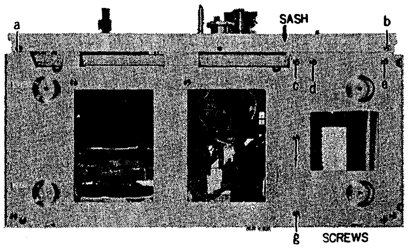
13


g
CONNECTION PLUGS

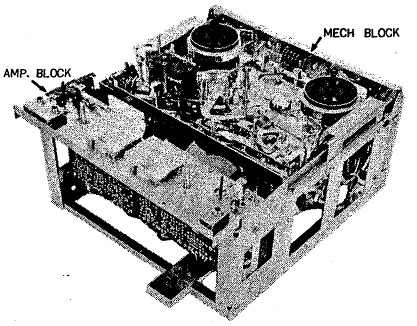
14


a
SASH
b
c
d
e
g
SCREWS

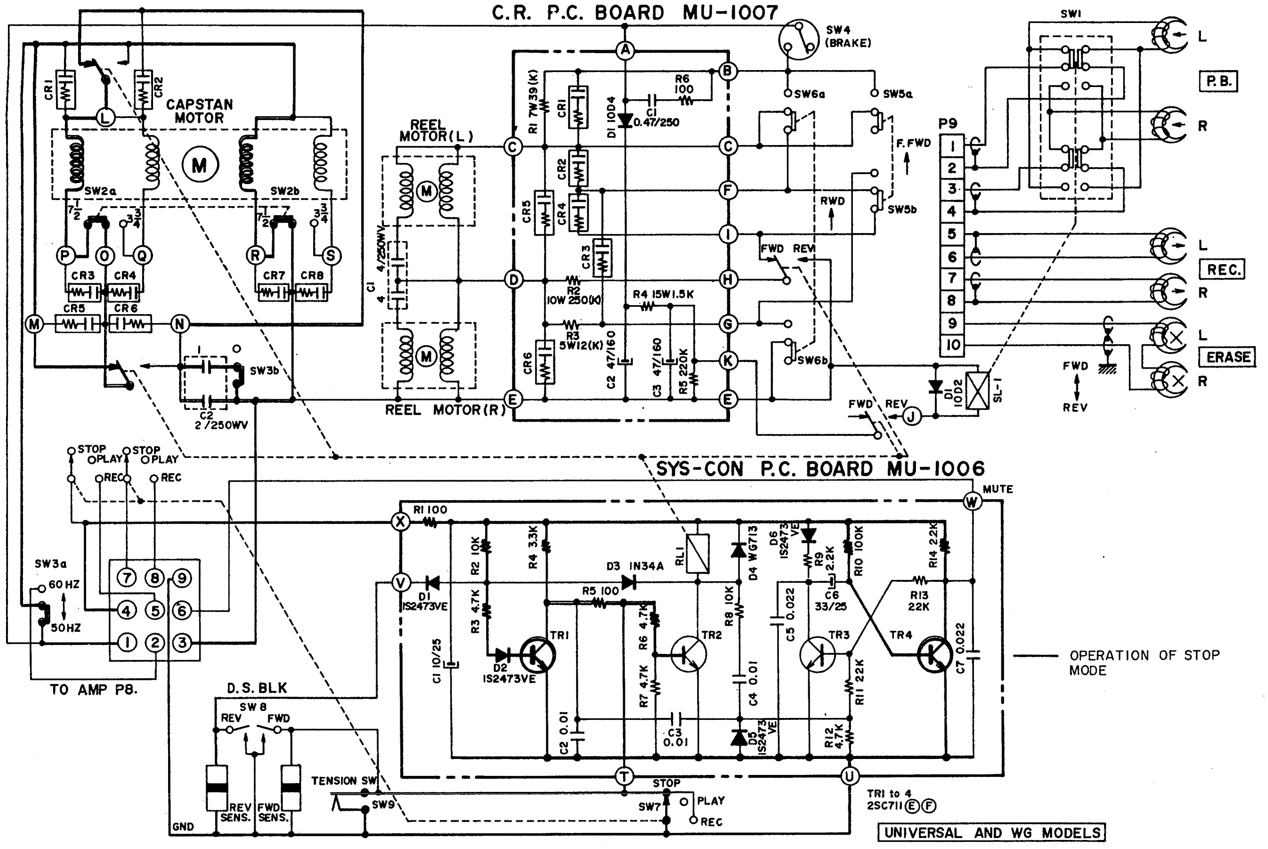
15


a
SASH
b
c
d
e
g
SCREWS

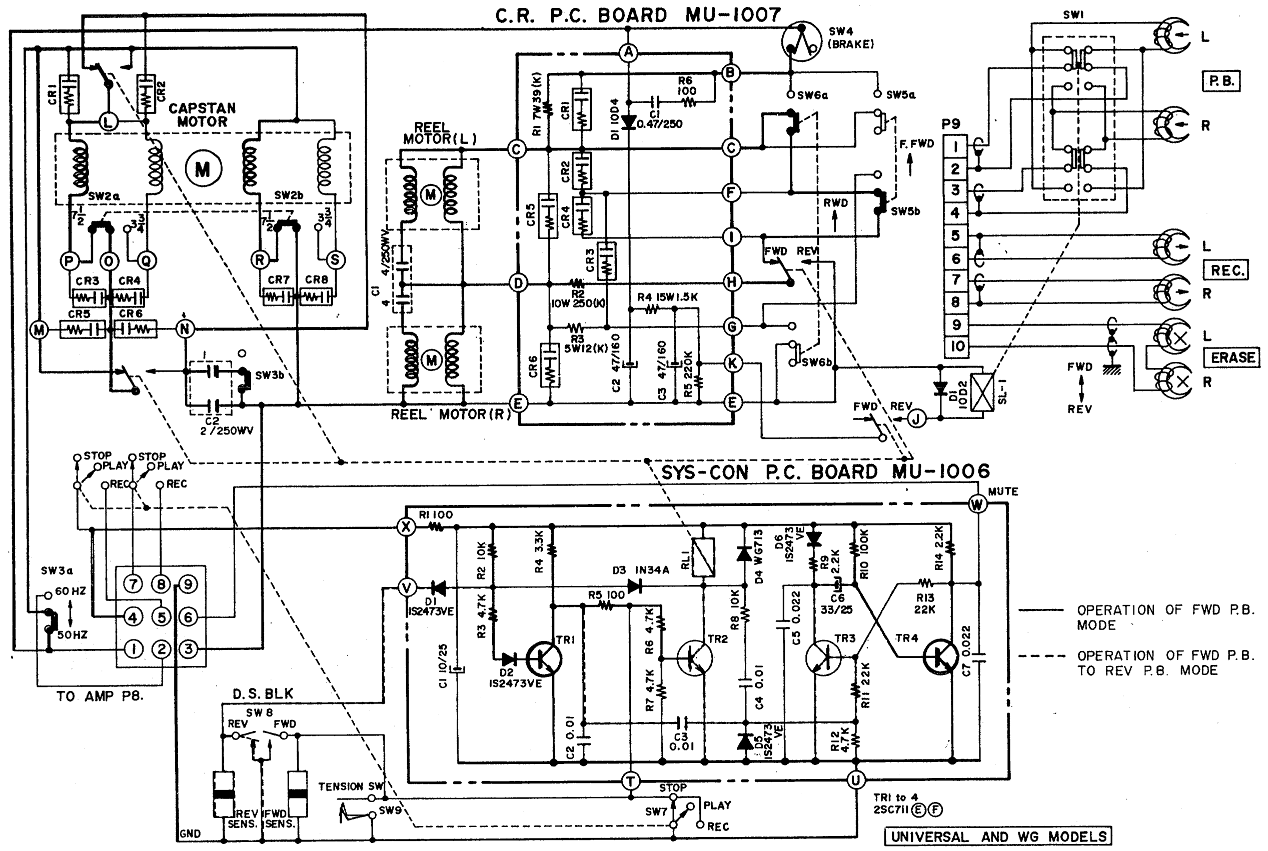
16


MECH BLOCK
AMP. BLOCK

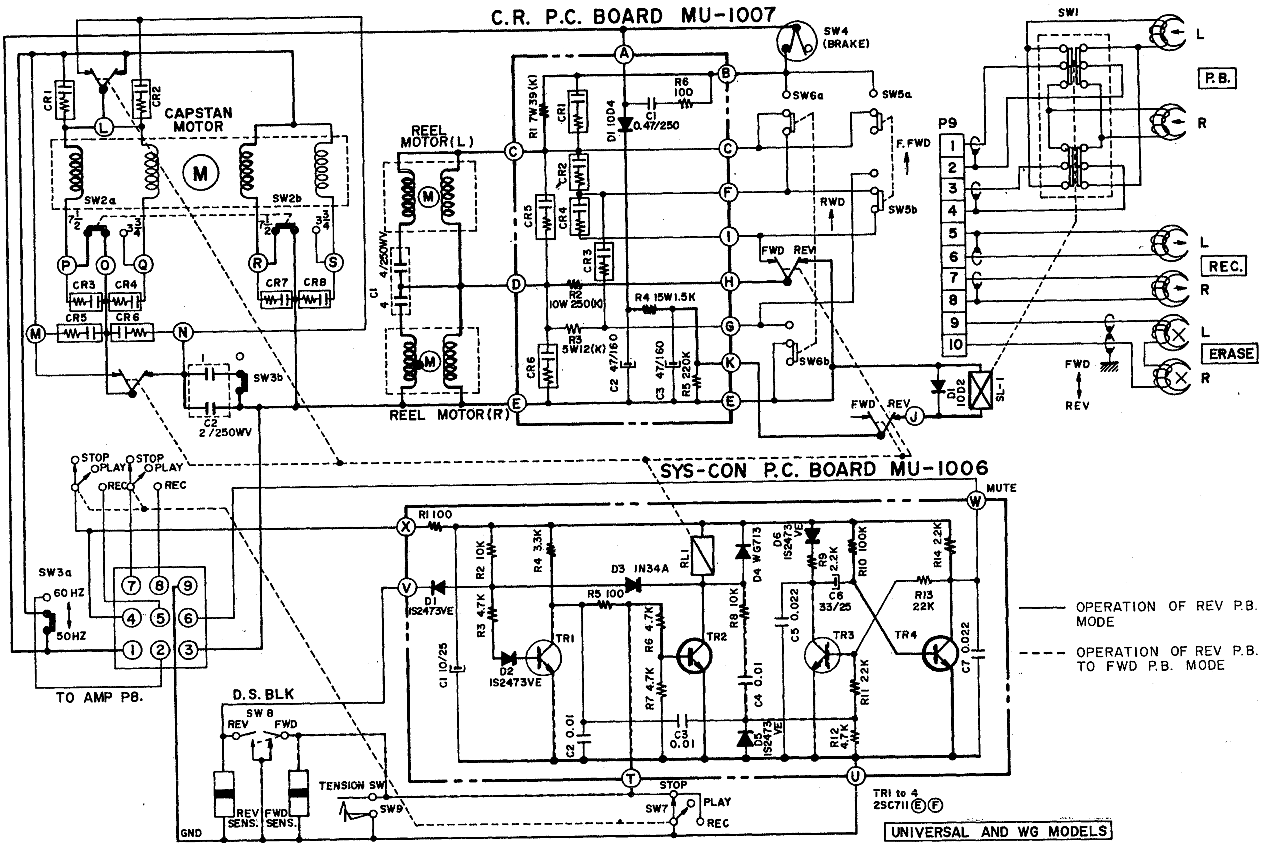
IV. SYSTEM CONTROL CIRCUIT OPERATION


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
SW1
L
P.B.
R
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR5
CR6
CR7
CR8
REEL MOTOR(L)
REEL MOTOR(R)
R1 7W39(K)
D1 10D4
C1 0.47/250
R6 100
C1 4/250WV
R2 10W 250(K)
R3 5W12(K)
R4 15W1.5K
C2 47/160
C3 47/160
R5 220K
SW6a
SW5a
F.FWD
RWD
SW5b
FWD
REV
SW6b
P9
REC.
ERASE
D1 10D2
SL-1
SW3b
C2 2/250WV
STOP
PLAY
REC
SW3a
60 HZ
50HZ
TO AMP P8.
SYS-CON P.C. BOARD MU-1006
MUTE
R1 100
R2 10K
R4 3.3K
D1 IS2473VE
R3 4.7K
D3 IN34A
R5 100
RL1
D4 WG713
D6 IS2473VE
R9 2.2K
R10 100K
R14 2.2K
C6 33/25
R13 22K
R8 10K
C5 0.022
R6 4.7K
TR1
TR2
TR3
TR4
C7 0.022
C1 10/25
D2 IS2473VE
R7 4.7K
C4 0.01
R11 22K
C2 0.01
C3 0.01
D5 IS2473VE
R12 4.7K
D.S. BLK
SW 8
TENSION SW
SW9
SW7
REV SENS.
FWD SENS.
GND
TR1 to 4 2SC711 Ⓔ Ⓕ
UNIVERSAL AND WG MODELS
OPERATION OF STOP MODE

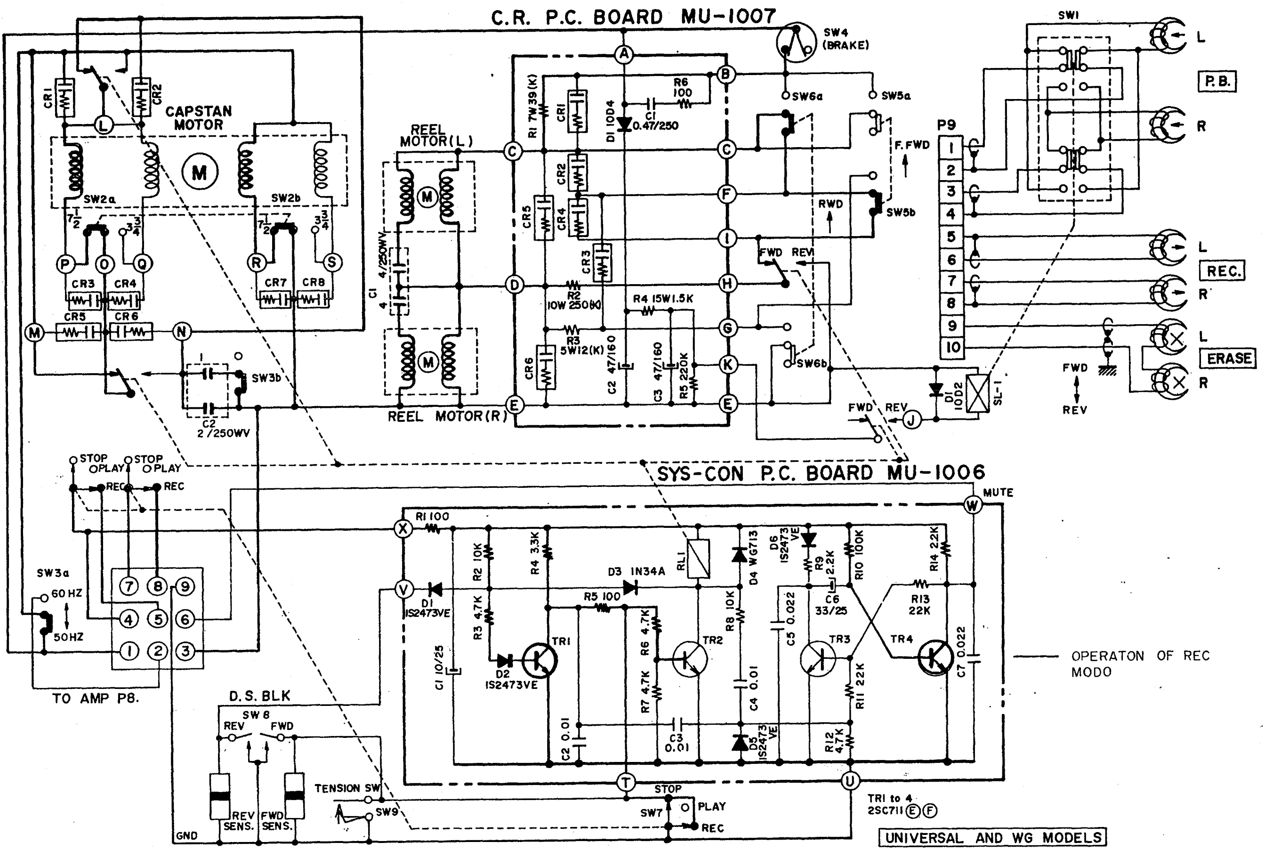
SCHEMATIC 1


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
SW1
L
P.B.
R
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR5
CR6
CR7
CR8
REEL MOTOR(L)
REEL MOTOR(R)
R1 7W39(K)
D1 10D4
C1 0.47/250
R6 100
C1 4/250WV
R2 10W 250(K)
R3 5W12(K)
R4 15W1.5K
C2 47/160
C3 47/160
R5 220K
SW6a
SW5a
F.FWD
RWD
SW5b
FWD
REV
SW6b
P9
REC.
ERASE
D1 10D2
SL-1
SW3b
C2 2/250WV
STOP
PLAY
REC
SW3a
60 HZ
50HZ
TO AMP P8.
SYS-CON P.C. BOARD MU-1006
MUTE
R1 100
R2 10K
R4 3.3K
D1 IS2473VE
R3 4.7K
D3 IN34A
R5 100
RL1
D4 WG713
D6 IS2473VE
R9 2.2K
R10 100K
R14 2.2K
C6 33/25
R13 22K
R8 10K
C5 0.022
R6 4.7K
TR1
TR2
TR3
TR4
C7 0.022
C1 10/25
D2 IS2473VE
R7 4.7K
C4 0.01
R11 22K
C2 0.01
C3 0.01
D5 IS2473VE
R12 4.7K
D.S. BLK
SW 8
TENSION SW
SW9
SW7
REV SENS.
FWD SENS.
GND
TR1 to 4 2SC711 Ⓔ Ⓕ
UNIVERSAL AND WG MODELS
OPERATION OF FWD P.B. MODE
OPERATION OF FWD P.B. TO REV P.B. MODE

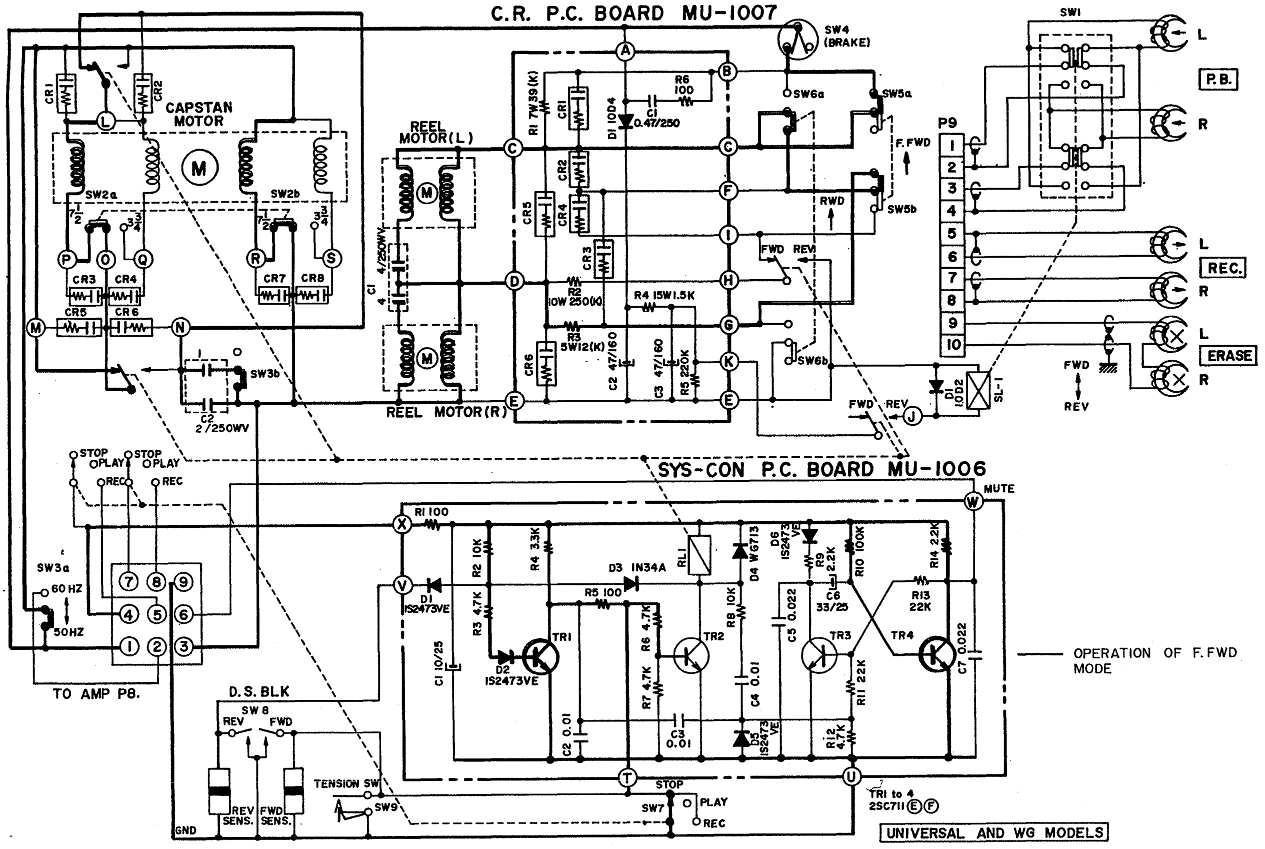
SCHEMATIC 2


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR5
CR6
CR7
CR8
REEL MOTOR(L)
REEL MOTOR(R)
C1 4/250WV
R1 7W39(K)
D1 10D4
R6 100
C1 0.47/250
R2 10W 250(K)
R3 5W12(K)
R4 15W1.5K
C2 47/160
C3 47/160
R5 220K
SW5a
SW6a
SW5b
SW6b
F.FWD
RWD
FWD REV
SW3b
C2 2/250WV
D1 10D2
SL-1
SW1
P.B.
REC.
ERASE
L
R
P9
FWD
REV
SYS-CON P.C. BOARD MU-1006
MUTE
STOP
PLAY
REC
SW3a
60HZ
50HZ
TO AMP P8.
R1 100
D1 IS2473VE
R2 10K
R3 4.7K
R4 3.3K
D2 IS2473VE
C1 10/25
D3 IN34A
R5 100
R6 4.7K
R7 4.7K
C2 0.01
C3 0.01
RL1
D4 WG713
R8 10K
C4 0.01
D5 IS2473VE
D6 IS2473VE
R9 2.2K
C5 0.022
C6 33/25
R10 100K
R11 22K
R12 4.7K
R13 22K
R14 2.2K
C7 0.022
TR1
TR2
TR3
TR4
D.S. BLK
SW 8
REV SENS.
FWD SENS.
TENSION SW
SW9
SW7
GND
TR1 to 4 2SC711Ⓔ Ⓕ
UNIVERSAL AND WG MODELS
OPERATION OF REV P.B. MODE
OPERATION OF REV P.B. TO FWD P.B. MODE

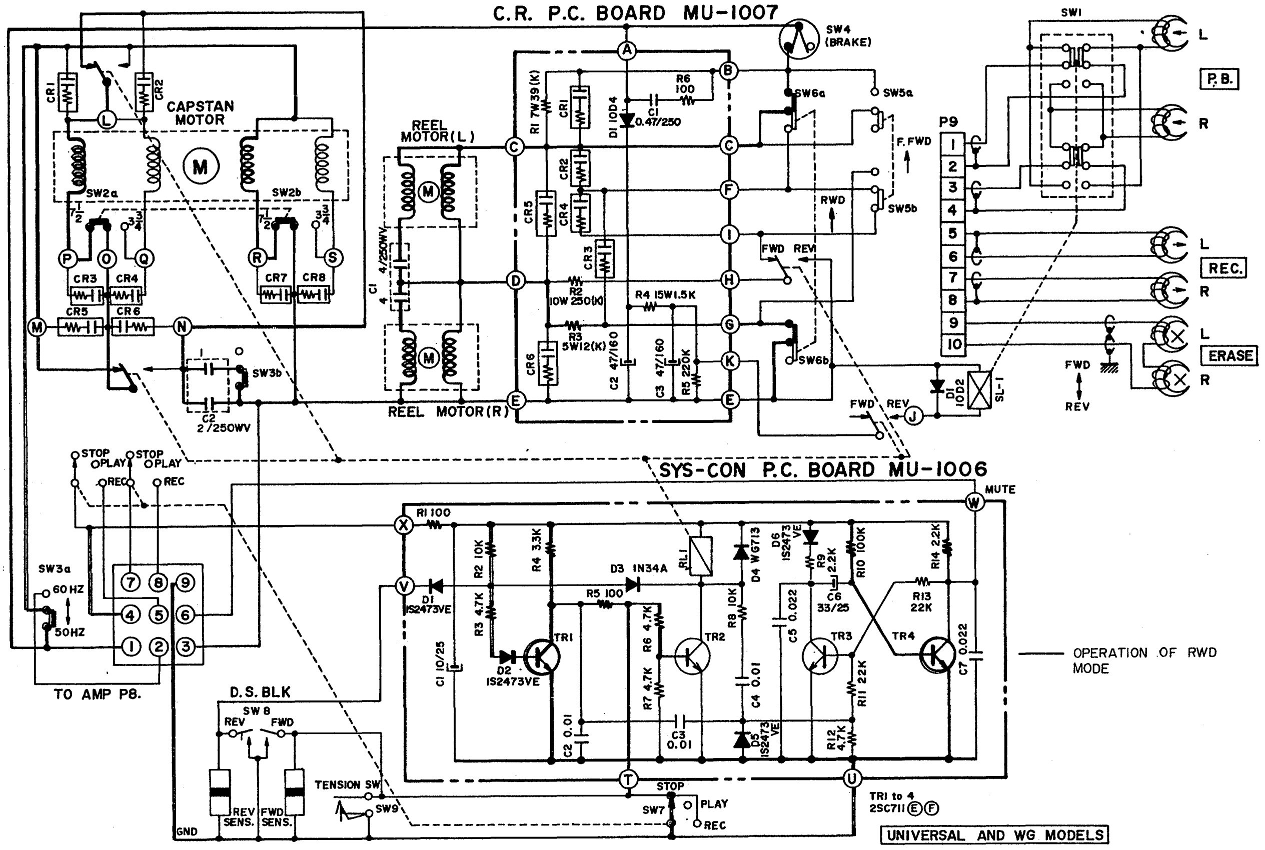
SCHEMATIC 3


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
CAPSTAN MOTOR
REEL MOTOR(L)
REEL MOTOR(R)
SW5a
SW6a
SW5b
SW6b
F.FWD
RWD
FWD REV
SW3b
C2 2/250WV
SW1
P.B.
REC.
ERASE
P9
SYS-CON P.C. BOARD MU-1006
MUTE
SW3a
60HZ
50HZ
TO AMP P8.
D.S. BLK
REV SENS.
FWD SENS.
TENSION SW
SW9
SW7
GND
TR1 to 4 2SC711Ⓔ Ⓕ
UNIVERSAL AND WG MODELS
OPERATON OF REC MODO

SCHEMATIC 4


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
CAPSTAN MOTOR
REEL MOTOR(L)
REEL MOTOR(R)
R1 7W39(K)
D1 10D4
C1 0.47/250
R6 100
R2 10W 250(K)
R3 5W12(K)
R4 15W1.5K
C2 47/160
C3 47/160
R5 220K
C1 4/250WV
C2 2/250WV
SW2a
SW2b
SW3a
SW3b
SW5a
SW5b
SW6a
SW6b
F.FWD
RWD
FWD REV
P9
SW1
P.B.
REC.
ERASE
D1 10D2
SL-1
SYS-CON P.C. BOARD MU-1006
MUTE
R1 100
D1 1S2473VE
D2 1S2473VE
D3 1N34A
D4 WG713
D5 1S2473VE
D6 1S2473VE
R2 10K
R3 4.7K
R4 3.3K
R5 100
R6 4.7K
R7 4.7K
R8 10K
R9 2.2K
R10 100K
R11 22K
R12 4.7K
R13 22K
R14 2.2K
C1 10/25
C2 0.01
C3 0.01
C4 0.01
C5 0.022
C6 33/25
C7 0.022
RL1
TR1
TR2
TR3
TR4
TR1 to 4 2SC711Ⓔ Ⓕ
STOP PLAY REC
SW7
60 HZ
50HZ
TO AMP P8.
D.S. BLK
SW 8
REV FWD
REV SENS.
FWD SENS.
TENSION SW
SW9
GND
OPERATION OF F.FWD MODE
UNIVERSAL AND WG MODELS

SCHEMATIC 5


C.R. P.C. BOARD MU-1007
SW4 (BRAKE)
CAPSTAN MOTOR
REEL MOTOR(L)
REEL MOTOR(R)
SYS-CON P.C. BOARD MU-1006
MUTE
P9
SW1
P.B.
REC.
ERASE
TO AMP P8.
D.S. BLK
TENSION SW
GND
OPERATION OF RWD MODE
TR1 to 4 2SC711Ⓔ Ⓕ
UNIVERSAL AND WG MODELS

SCHEMATIC 6

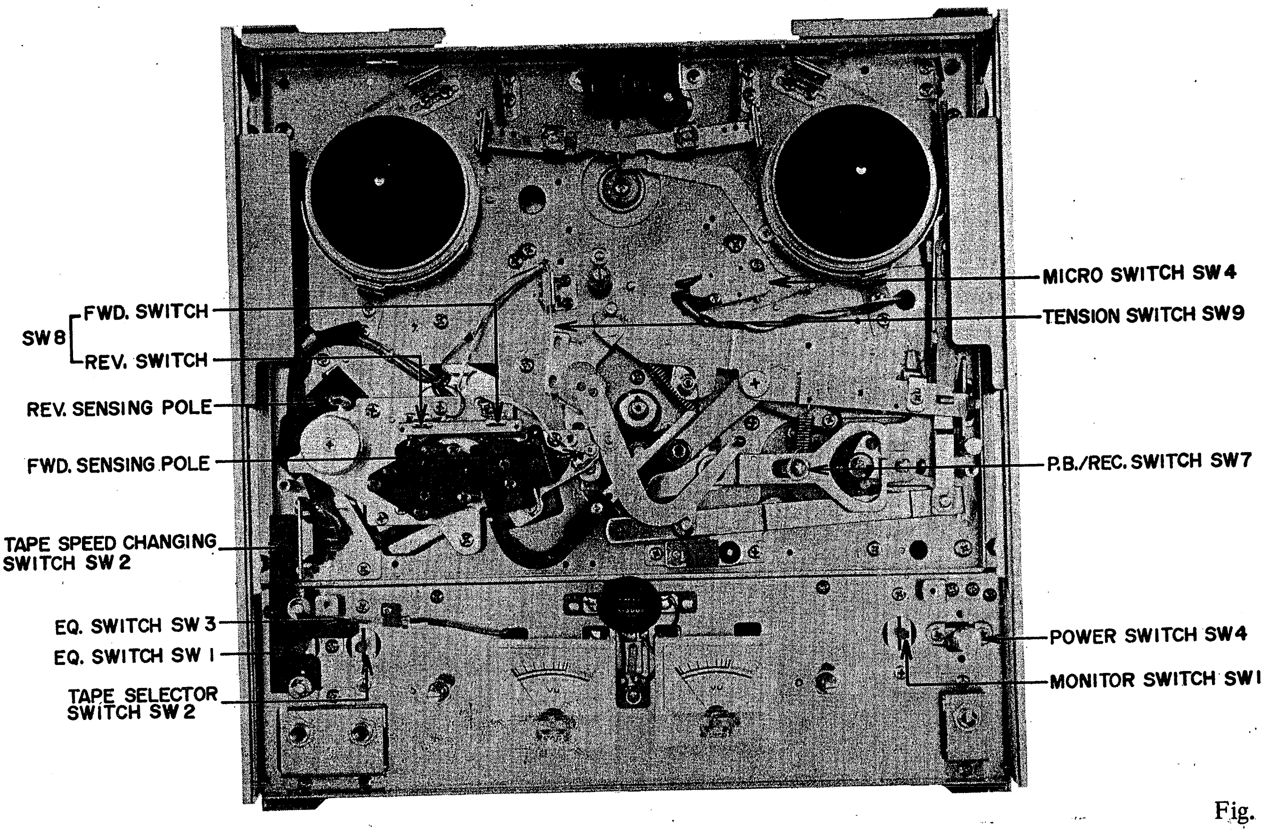


Fig. 7

1. STOP MODE (Refer to Schematic Diagram-1)

At Stop Mode, the various System Control (hereinafter referred to as SYSCON) transistors are maintained as follows: TR1(ON), TR2(OFF), TR3(OFF), and TR4(ON). Accordingly, the reverse relay connected to the collector of TR2 is OFF, and capstan motor revolutions are in forward direction. Also as TR4 is ON and TR4 collector voltage is roughly zero and thus Diode D1 (Playback Amp. P.C. Board) connected to the collector of TR4 is turned OFF, the playback Amp. Mute Circuit is also turned OFF. Both the supply and take-up reel motor are equipped with a Micro Switch SW4 which is activated to OFF and ON by the operation of the brake lever, and which at Stop Mode are turned OFF. Consequently, no voltage is supplied to either reel motor (both reel motors are connected in series).

When at Stop Mode, switching by means of P.B./REC Switch SW-7 does not take place because the base of SYSCON TR2 is grounded and maintained at OFF condition.

That is to say, capstan motor revolutions will not reverse even when a REV Button is depressed.

When the tension lever is raised, Tension Switch SW-9 is turned OFF. Thus, when no tape is loaded, this switch is ON.

Also, because Tension Switch SW-9 is installed in parallel with P.B./REC Switch SW-7, when SW-7 is at Stop Mode, if a tape is loaded, but not threaded through the Tension Lever and playback is effected, reverse mode cannot be effected when a Reverse Button is depressed. And, of course, reverse mode will not be effected when the sensing foil passes the sensing poles.

2. FORWARD PLAYBACK MODE (Refer to Schematic Diagram-2)

When the P.B./REC Switch is at PLAY position, the various SYSCON transistors are maintained as follows: TR1(ON), TR2(OFF), TR3(OFF), and TR4 (ON), i.e. functionally, the same as at stop mode. The difference is that the base of TR2 which was grounded by P.B./REC Switch SW-7 is now open. That is to say, when TR1 is turned OFF and TR1 collector voltage increases, bias is supplied to TR2, and TR2 is turned ON. Accordingly, while TR1 is (ON) and TR2(OFF) (FWD Playback Mode), capstan motor revolutions are in forward direction. Also Micro SW-4 is ON, and voltage is supplied to both reel motors.

At FWD Playback mode, an R2 (10W, 250Ω) resistor is in parallel with left reel motor winding. That is to say, the left reel motor resistance differs from the right reel motor resistance due to the R2 (10W, 250Ω) resistor which is parallel with the left reel motor as shown in Fig. 8.

In short, the voltage supplied to the left reel motor is low and FWD. Playback mode is maintained.

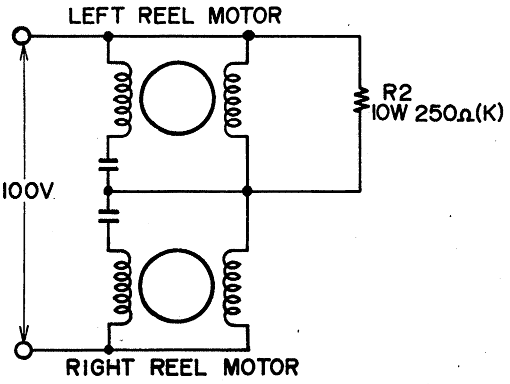

LEFT REEL MOTOR
R2
10W 250Ω(K)
100V
RIGHT REEL MOTOR

Fig. 8

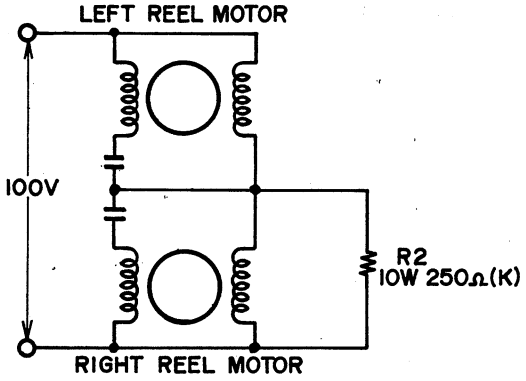

LEFT REEL MOTOR
100V
R2
10W 250Ω(K)
RIGHT REEL MOTOR

Fig. 9

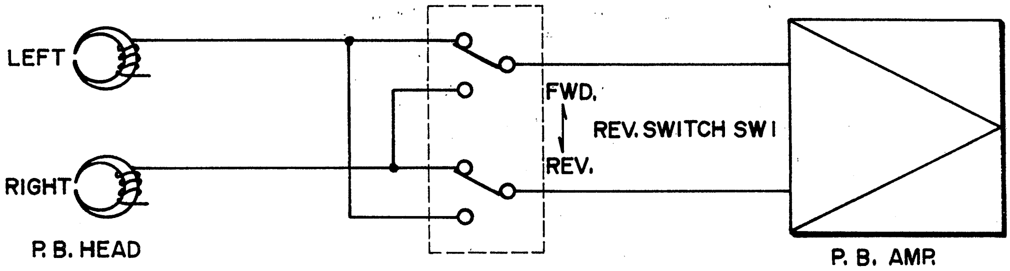

LEFT
RIGHT
P. B. HEAD
FWD.
REV. SWITCH SW1
REV.
P. B. AMP.

Fig. 10

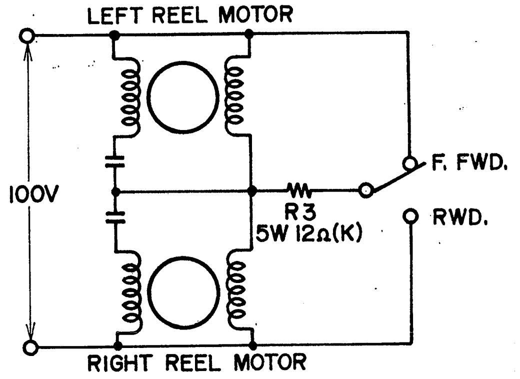

LEFT REEL MOTOR
100V
F. FWD.
R3
5W 12Ω(K)
RWD.
RIGHT REEL MOTOR

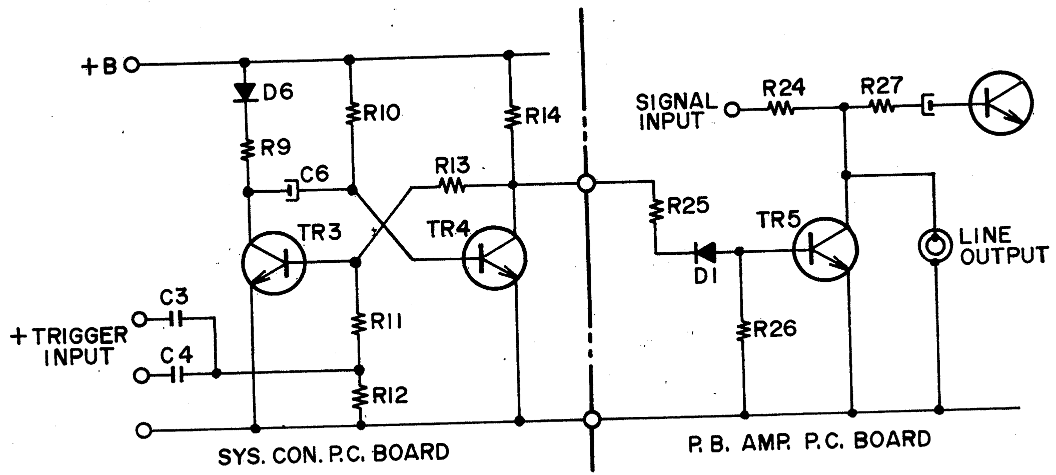
Fig. 11

3. FROM FWD TO REV PLAYBACK, AND REV PLAYBACK MODE

(Refer to Schematic Diagrams-2, 3)

When the sensing tape passes the reverse sensing poles or when the Reverse Button is depressed, the base of TR1 is biased at zero electrical potential and TR1 is instantly turned OFF, TR1 collector voltage increases and bias is applied to the base of TR2, TR2 is turned ON, and Reverse Relay RL-1 is turned ON. In this TR1 and TR2 circuit, TR1 is maintained at OFF and TR2 at ON by means of Diode D3 (1N34A). (Refer to Schematic Diagram-3) By means of the reverse relay function, current flows from the reverse direction to the capstan motor sub coil, and reverse revolutions begin. Also, at FWD playback time, Resistor R2 (10W, 250Ω) connected in parallel with the left reel motor becomes parallel with the right reel motor. (Refer to Fig. 9)

At this condition, reverse playback begins and is maintained, and the capstan motor revolutions begin reversing from forward direction. For normalized and stable revolutions, flywheel inertia at time of forward revolutions and flywheel mass when reverse revolutions begin is applied so that stabilized tape speed is not immediate. For this reason, the signal output circuit must be muted until the capstan motor revolutions have been stabilized. (Refer to MUTING CIRCUIT OPERATION explanation)
Solenoid Plunger SL1 also functions to shift down Reverse Switch SW-1 and the P.B. Head. In other words, P.B. Head left and right channels are reversed by means of SW-1 as shown in Fig. 10.



SCHEMATIC 7

4. FROM REVERSE TO FORWARD PLAYBACK (Refer to Schematic Diagram-3)

When the sensing tape passes the FWD sensing pole or when the FWD Button is depressed and the base of TR2 becomes biased at zero electrical potential, TR2 is instantly turned OFF, and reverse relay RL-1 is also turned OFF.

Diode D3 (1N34A) is also inverse biased, TR1 base current passes R2 (10 kΩ), R3 (4.7 kΩ), and D2 (1S2473VE) and is biased, and TR1 is turned ON and maintained.

Consequently, reverse relay RL1 returns to it's original condition (FWD P.B.) and FWD playback mode is effected.

Refer to MUTING CIRCUIT OPERATION for mute function during change from REV to FWD playback.

5. RECORDING MODE

SYSCON operation at recording time is exactly the same as Stop mode.

6. FAST FORWARD AND REWIND MODE (Refer to Schematic Diagrams-5, 6)

In this case, SYSCON operation is also exactly the same as Stop mode. However, the voltage supply to both reel motors are as shown in Fig. 11.

7. MUTING CIRCUIT OPERATION (Refer to Schematic Diagrams 2, 3, and 7)

As shown in Schematic Diagram-7, the muting circuit is made up of an electronic switch from transistor TR5 and a one-shot multi-vibrator comprised of TR3 and TR4. When stabilization is attained, TR3 of the one-shot multi-vibrator is turned OFF, and TR4 turned ON. Accordingly, the electrical potential of TR4 collector is lowered, Zener Diode D1 is biased in reverse direction, and TR5 assumes an OFF condition. If Button SW-8 is now depressed for FWD to REV playback, or REV to FWD playback, a charge current flows to condenser C3 or C4. Thus the base of TR3 is biased (this becomes the trigger signal), the one-shot multi vibrator comprised of TR3 and TR4 is inverted, and after a certain period of time (2 to 3 seconds) again returns to it's stabilized condition.

Further, while this one-shot multi-vibrator is inverted, (while TR4 is OFF) because TR4 collector voltage is high, the voltage exceeding the zener point of Zener Diode D1 is applied to the cathode of D1 and D1 assumes a lead-through condition. Thus, electronic switch transistor TR5 is turned ON, and the signal is muted (the internal resistance TR5 at lead through time is extremely low).

V. MECHANISM ADJUSTMENTS

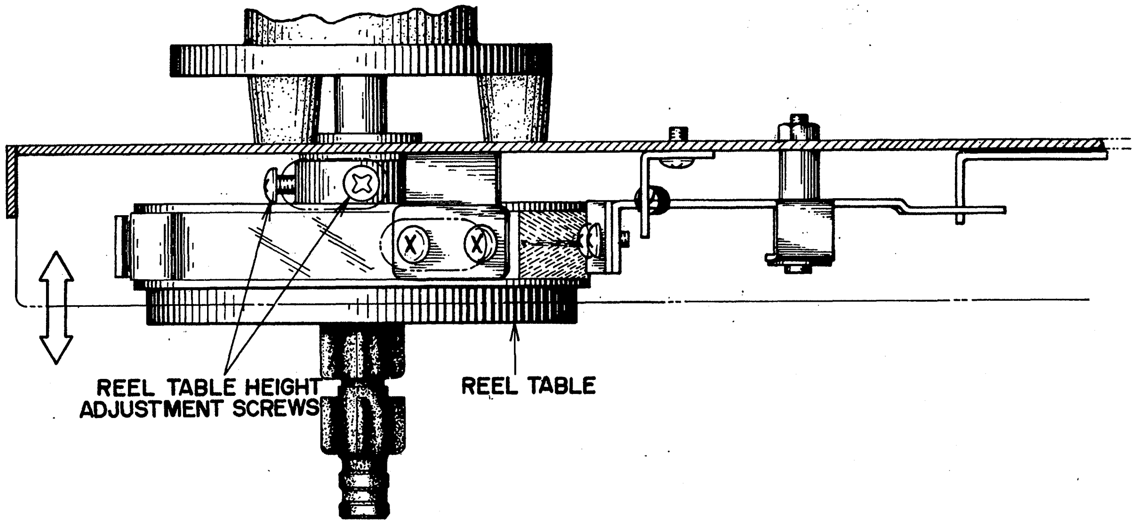

REEL TABLE HEIGHT
ADJUSTMENT SCREWS
REEL TABLE

Fig. 12

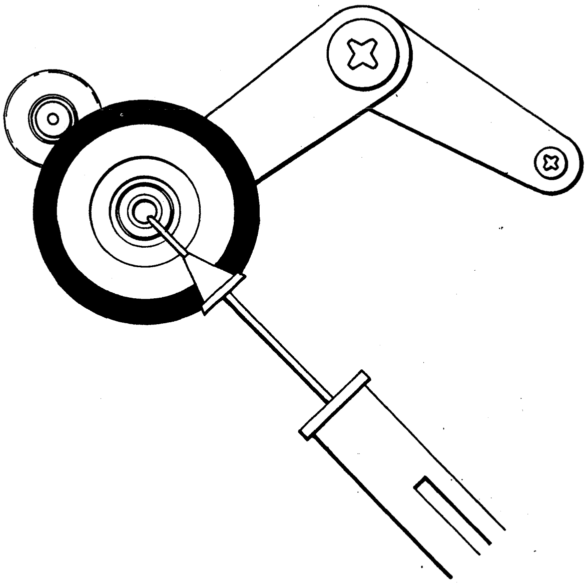


Fig. 13

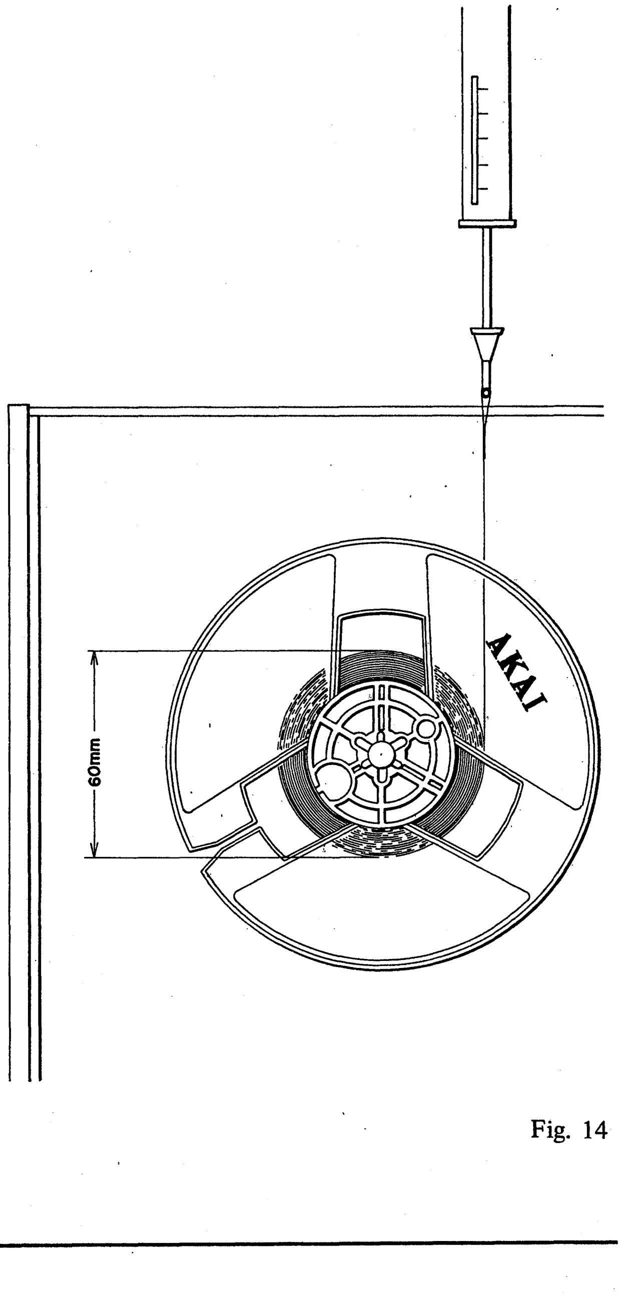


Fig. 14

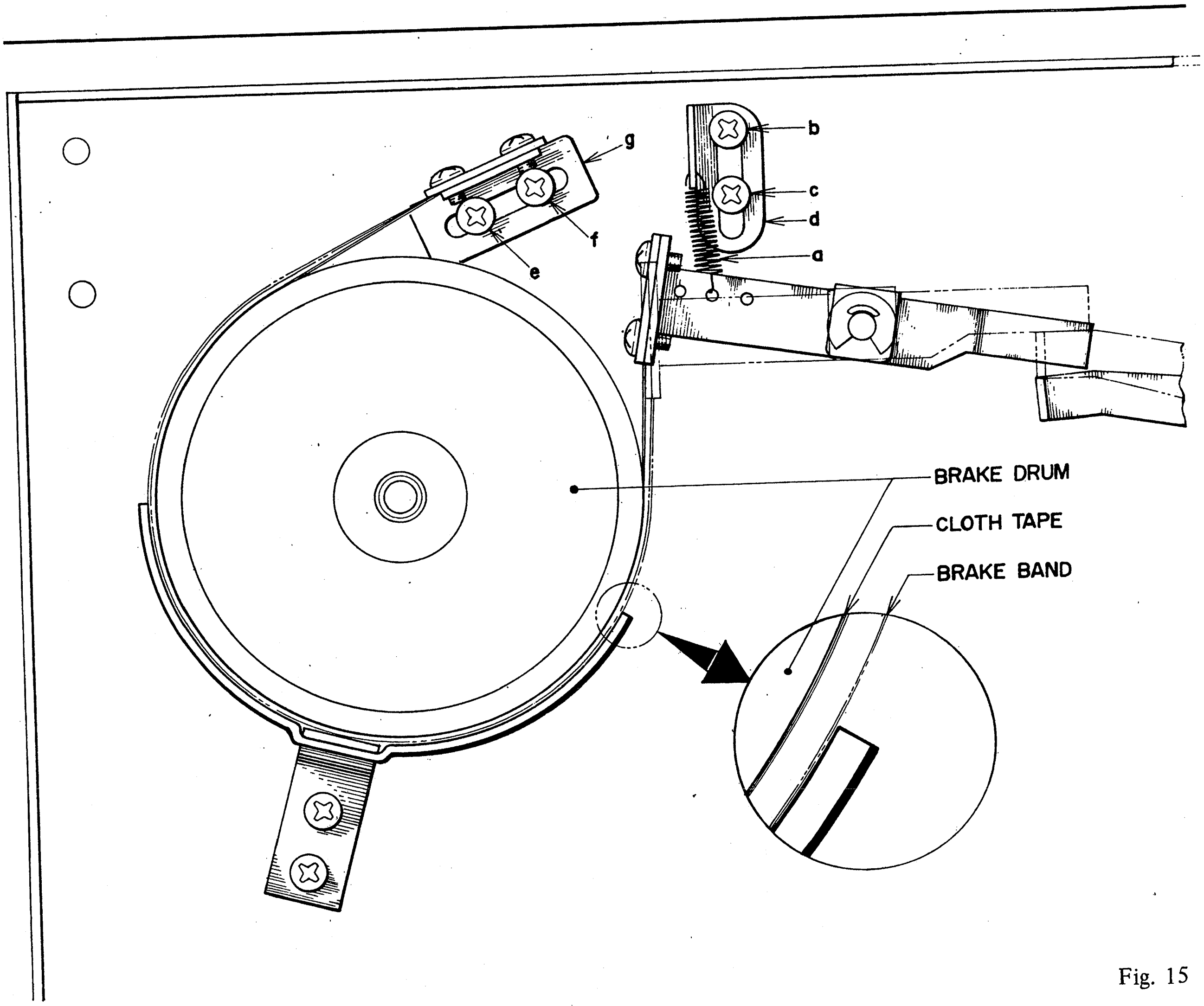


Fig. 15

1. REEL TABLE HEIGHT ADJUSTMENT

As shown in Fig. 12, loosen reel table height adjustment screws, and adjust reel table height by moving table in direction of arrow and positioning so that the tape winds in the center of the reel.

2. PINCH WHEEL PRESSURE MEASURING METHOD

Measure pinch wheel pressure with a tension gauge as shown in Fig. 13. Read the value on the tension gauge as soon as the pinch wheel separates from the tape and tape travel stops. Ideal pinch wheel pressure is 1.8 kg.

3. BRAKE TENSION ADJUSTMENT

1) As shown in Fig. 14, use a 60 mm diameter tape wound on a 5" reel and measure the brake tension with a tension gauge. Ideal brake tension is from 300 to 370 grams.
2) Brake tension adjustment can be made as follows: (Refer to Fig. 15)
   a) Change position of suspended spring (a).
   b) Loosen screws (b) and (c) and adjust the vertical position of spring suspension metal (d).
   c) Loosen screws (e) and (f) and adjust the horizontal position of brake band suspension metal (g).
   d) Only the left side is shown in Fig. 15, but the right side must be adjusted in the same way.

NOTE: In making brake tension adjustment, at all modes except stop mode, confirm that the brake band completely separates from the cloth tape on the brake drum. (Refer to Fig. 15)

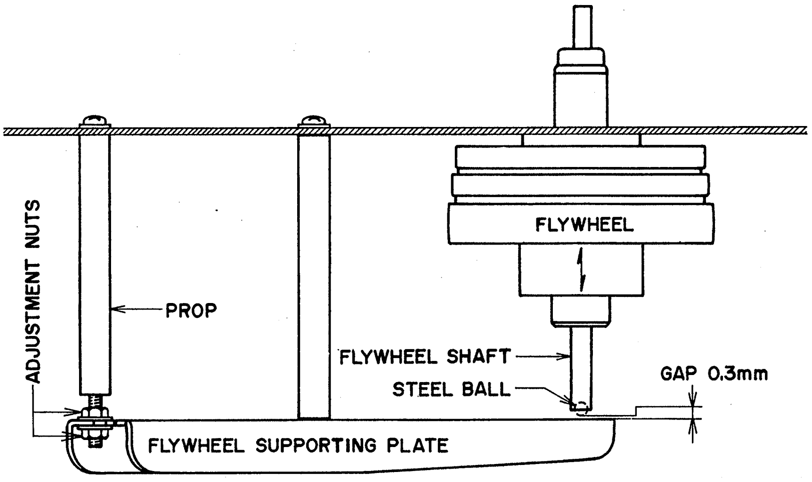

ADJUSTMENT NUTS
PROP
FLYWHEEL
FLYWHEEL SHAFT
STEEL BALL
GAP 0.3mm
FLYWHEEL SUPPORTING PLATE

Fig. 16

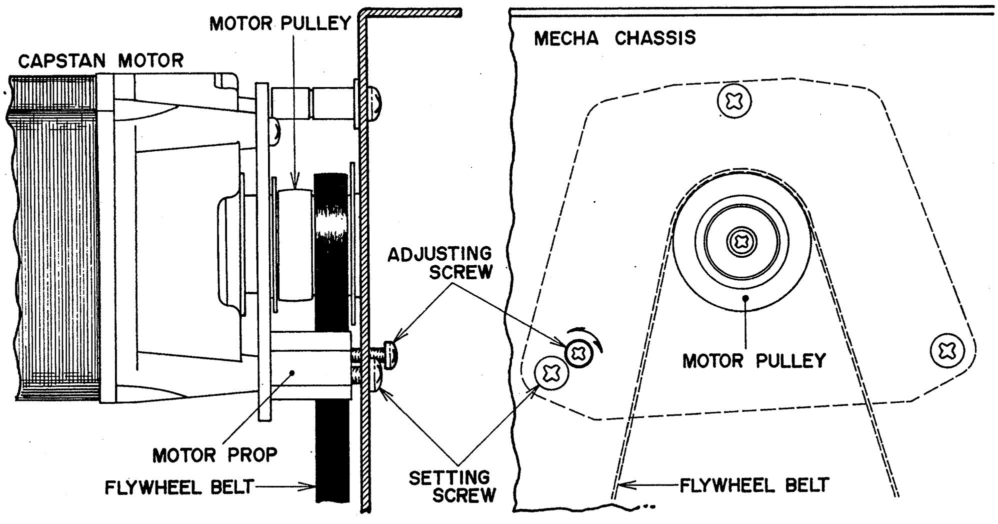

MOTOR PULLEY
CAPSTAN MOTOR
ADJUSTING SCREW
MOTOR PROP
FLYWHEEL BELT
SETTING SCREW
MECHA CHASSIS
MOTOR PULLEY
FLYWHEEL BELT

Fig. 17

4. LEFT AND RIGHT REEL MOTOR TENSION AT VARIOUS OPERATING MODES

Reel Motor / Mode	Left Reel Motor	Right Reel Motor
FWD P.B.	60g	180g
REV P.B.	180g	60g
F.FWD	10g	450g
RWD	450g	10g

Chart 1

5. FLYWHEEL LOOSE PLAY ADJUSTMENT

Turn the adjustment nuts to obtain a 0.3 mm gap between the steel ball and flywheel supporting plate when the flywheel is moved in the direction of the arrow as shown in Fig. 16.

6. FLYWHEEL BELT POSITION ADJUSTMENT

1) With capstan motor revolutions operating at Rev. mode, loosen setting screw and turn flywheel belt position adjustment screw until the flywheel belt comes to the center of the motor pulley. (Refer to Fig. 17)
2) Tighten setting screw to maintain center positioning of flywheel belt at Rev. mode.
3) Confirm that the flywheel belt runs on the center of the motor pulley at Fwd. mode also.

VI. HEAD ADJUSTMENTS

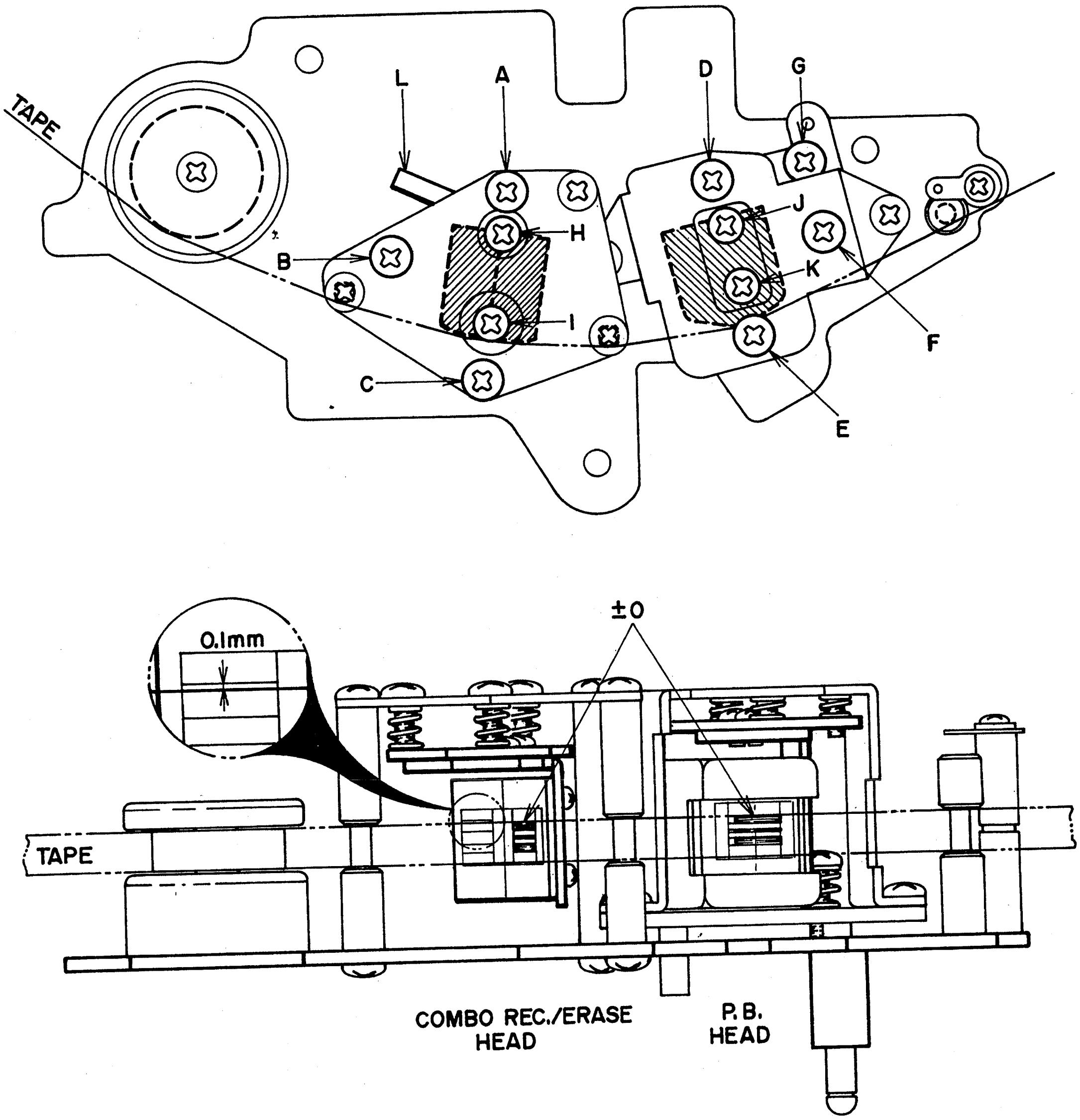


Fig. 18

1. HEAD HEIGHT ADJUSTMENT

1) COMBO Head

At Playback mode adjust COMBO head height by turning screws (A) (B) and (C) shown in Fig. 18 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel recording head core.

2) Playback Head

a) At Forward Playback mode, adjust playback head height by turning screws (D) (E) and (F) shown in Fig. 18 to left and right until the upper edge of the tape is the same height as the upper edge of the left channel playback head core.

b) At Reverse Playback mode, adjust playback head height by turning screw (G) shown in Fig. 18 to left and right until the lower edge of the tape is the same height as the lower edge of the right channel playback head core.

2. HEAD AZIMUTH ALIGNMENT ADJUSTMENT

1) Playback Head

a) Connect a high sensitivity V.T.V.M. to the line output terminals.

b) Set the Tape Speed Switch to 7-1/2 ips. (19 cm/sec.), and set the Monitor Switch to TAPE position.

c) Playback an 8,000 Hz 3-3/4 ips. recorded Ampex Alignment test tape.

d) At Forward Playback mode, turn Azimuth Alignment Screw (F) shown in Fig. 18 to obtain maximum line output level on both channels.

e) After the adjustment in Item d) above has been completed, loosen screws (J) and (K) shown in Fig. 18 and move the head gap side of the playback head to left and right. When tension is applied to the supply reel side and the line output level of both channels do not fluctuate, (maximum allowable fluctuation within +0.5/−0 dB) fix screws (J) and (K) to maintain this condition.

f) At reverse playback mode, make the same adjustment as outlined above until the line output level of both channels do not fluctuate.

2) COMBO Head

a) Connect an audio frequency oscillator to the line input terminals, and connect a high sensitivity V.T.V.M. to the line output terminals and load a blank tape.

b) Set the Tape Speed Switch to 7-1/2 ips. (19 cm/sec.) and set the monitor switch to TAPE position.

c) Record a 16,000 Hz audio frequency at −10 dB recording level.

d) At recording mode, turn Azimuth Alignment Adjustment Screw (B) shown in Fig. 18 to left and right until the line output level of both channels is maximum and does not fluctuate.

e) After completing adjustment in Item d) above, adjust gap side of recording head by moving installation angle (L) shown in Fig. 18 to left and right until the line output level of both channels do not fluctuate (maximum allowable fluctuation within +0.5/−0 dB) when tension is applied to the supply reel side.

3. To obtain best results, repeat adjustments outlined in paragraphs 1 and 2 above 2 or 3 times. New blank tape should be used when making these adjustments.

VII. AMPLIFIER ADJUSTMENTS

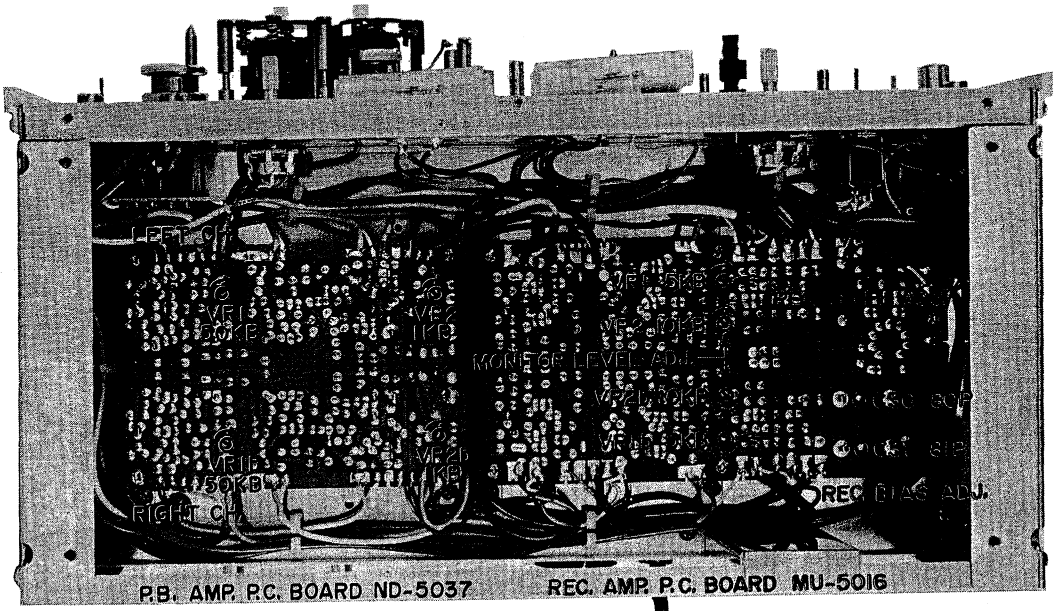

LEFT CH.
VR1 50KB
VR2 1KB
VR1 5KB
VR2 10KB
MONITOR LEVEL ADJ.
VR2b 10KB
VR1b 5KB
VR1b 50KB
VR2b 1KB
RIGHT CH.
REC BIAS ADJ.
P.B. AMP. P.C. BOARD ND-5037
REC. AMP. P.C. BOARD MU-5016

Fig. 19

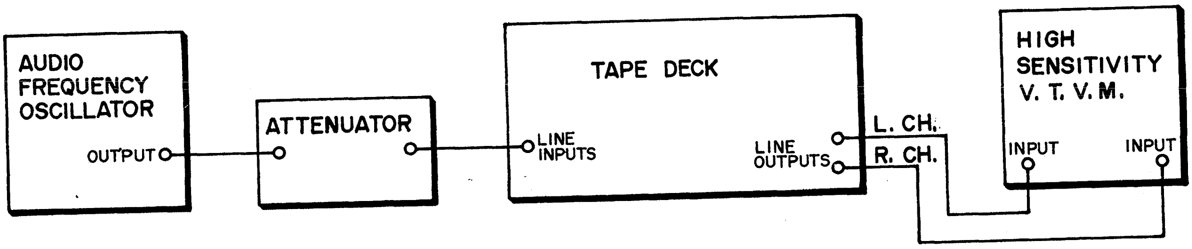
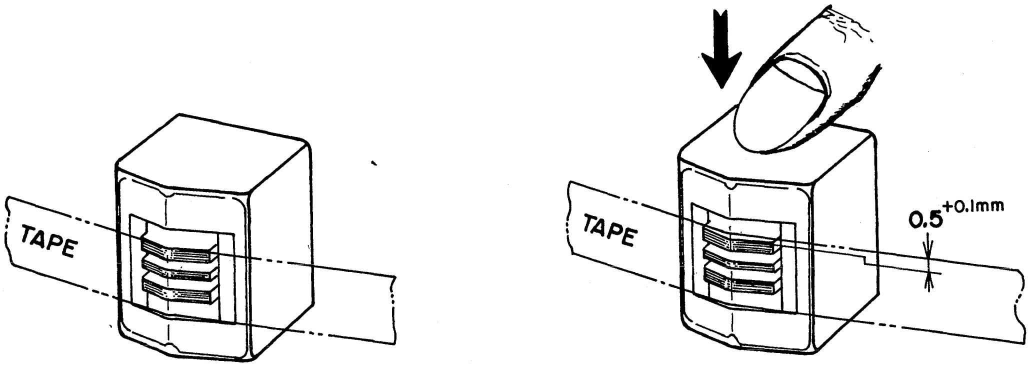

AUDIO FREQUENCY OSCILLATOR
OUTPUT
ATTENUATOR
TAPE DECK
LINE INPUTS
LINE OUTPUTS
L. CH.
R. CH.
HIGH SENSITIVITY V. T. V. M.
INPUT
INPUT

Fig. 20


TAPE
TAPE
0.5+0.1mm

RIGHT CH. P.B. LEVEL ADJUSTMENT

LELT CH. P. B. LEVEL ADJUSTMENT

Fig. 21

Connect the various measuring instruments as shown in Fig. 20.

1. PLAYBACK LEVEL ADJUSTMENTS

1) Set Tape Speed Selector to 7-1/2 ips.
2) Set Monitor Switch to TAPE position.
3) Playback a 250 Hz recorded test tape at 7-1/2 ips.
4) Adjust Playback Amp. P.C. Board semi-fixed resistors VR1 50 kB (left ch.), and VR1b 50 kB (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.
5) When making the left channel line output level adjustment, press playback head slightly downward with one finger and regulate to 4 dB.

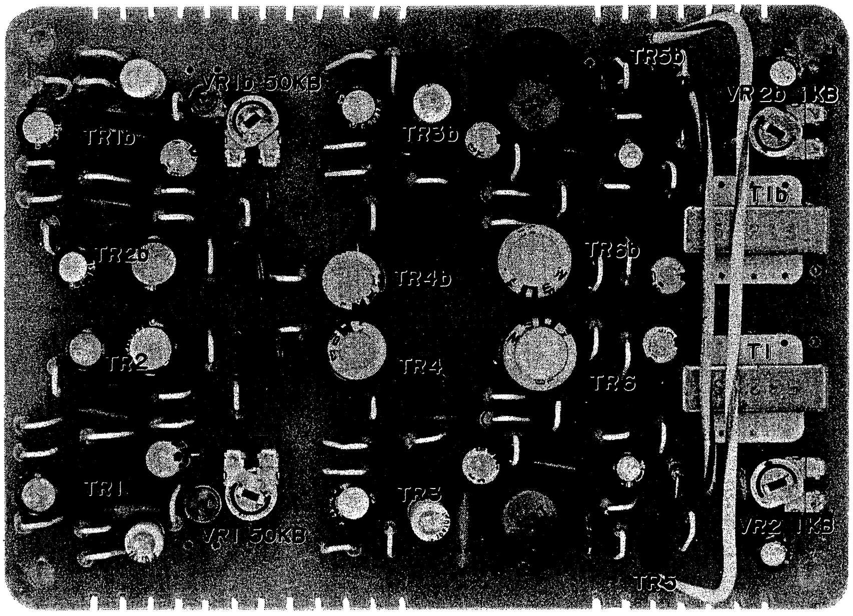

TR5b
VR1b 50KB
TR1b
TR3b
VR2b 1KB
T1b
TR2b
TR4b
TR6b
TR2
TR4
TR6
T1
TR1
TR3
VR1 50KB
VR2 1KB
TR5

Fig. 22 PLAYBACK AMP. P.C. BOARD ND-5037

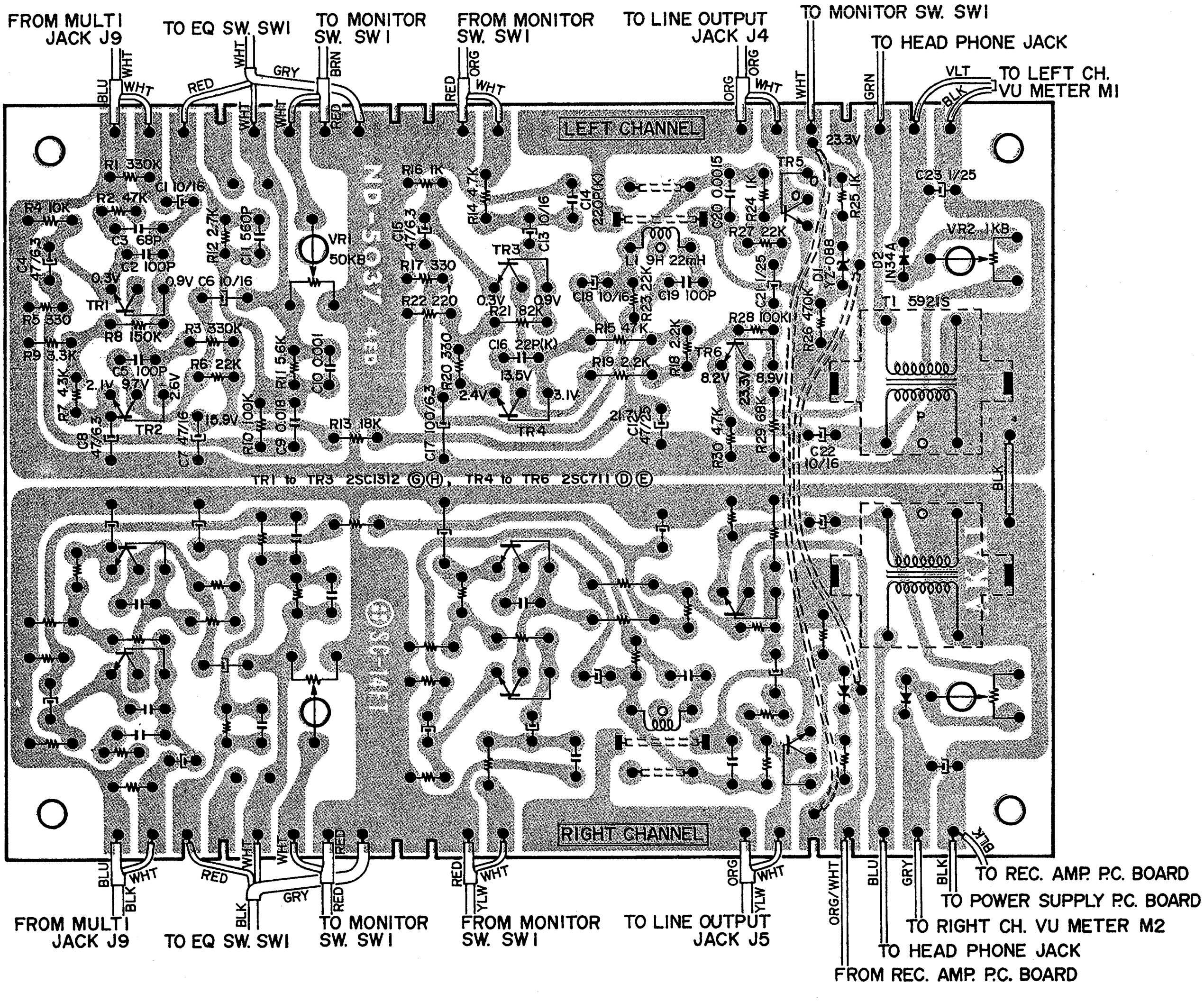

FROM MULTI JACK J9
TO EQ SW. SWI
TO MONITOR SW. SW I
FROM MONITOR SW. SWI
TO LINE OUTPUT JACK J4
TO MONITOR SW. SWI
TO HEAD PHONE JACK
TO LEFT CH. VU METER MI
BLU
WHT
RED
GRY
BRN
ORG
GRN
VLT
BLK
LEFT CHANNEL
ND-5037 4ED
R1 330K
C1 10/16
R2 47K
R4 10K
C3 68P
C2 100P
C4 47/6.3
R12 2.7K
C11 560P
VR1 50KB
R16 1K
C16 47/6.3
R14 4.7K
C13 10/16
C14 220P(K)
C20 0.0015
R24 1K
TR5
R25 1K
23.3V
C23 1/25
VR2 1KB
D2 IN34A
D1 YZ-088
R27 22K
L1 9H 22mH
C18 10/16
R23 2.2K
C19 100P
C21 1/25
R26 470K
T1 5921S
R28 100K
TR6
R5 330
0.3V
0.9V
C6 10/16
TR1
R8 150K
R9 3.3K
R3 330K
R6 22K
C5 100P
R7 4.3K
2.1V
9.7V
2.6V
15.9V
TR2
C8 47/6.3
C7 47/16
R10 100K
C9 0.018
R11 5.6K
C10 0.001
R13 18K
R17 330
R22 220
TR3
R21 82K
R20 330
C16 22P(K)
13.5V
2.4V
3.1V
C17 100/6.3
TR4
R15 47K
R19 2.2K
R18 22K
8.2V
23.3V
8.9V
21.7V
C17 47/25
R30 4.7K
R29 68K
C22 10/16
P
TR1 to TR3 2SC1312 Ⓖ Ⓗ, TR4 to TR6 2SC711 Ⓓ Ⓔ
SC-14T
AKAI
RIGHT CHANNEL
YLW
ORG/WHT
FROM MULTI JACK J9
TO EQ SW. SWI
TO MONITOR SW. SW I
FROM MONITOR SW. SWI
TO LINE OUTPUT JACK J5
TO REC. AMP. P.C. BOARD
TO POWER SUPPLY P.C. BOARD
TO RIGHT CH. VU METER M2
TO HEAD PHONE JACK
FROM REC. AMP. P.C. BOARD

Fig. 23 PLAYBACK AMP. P.C. BOARD ND-5037 (Reverse Side)

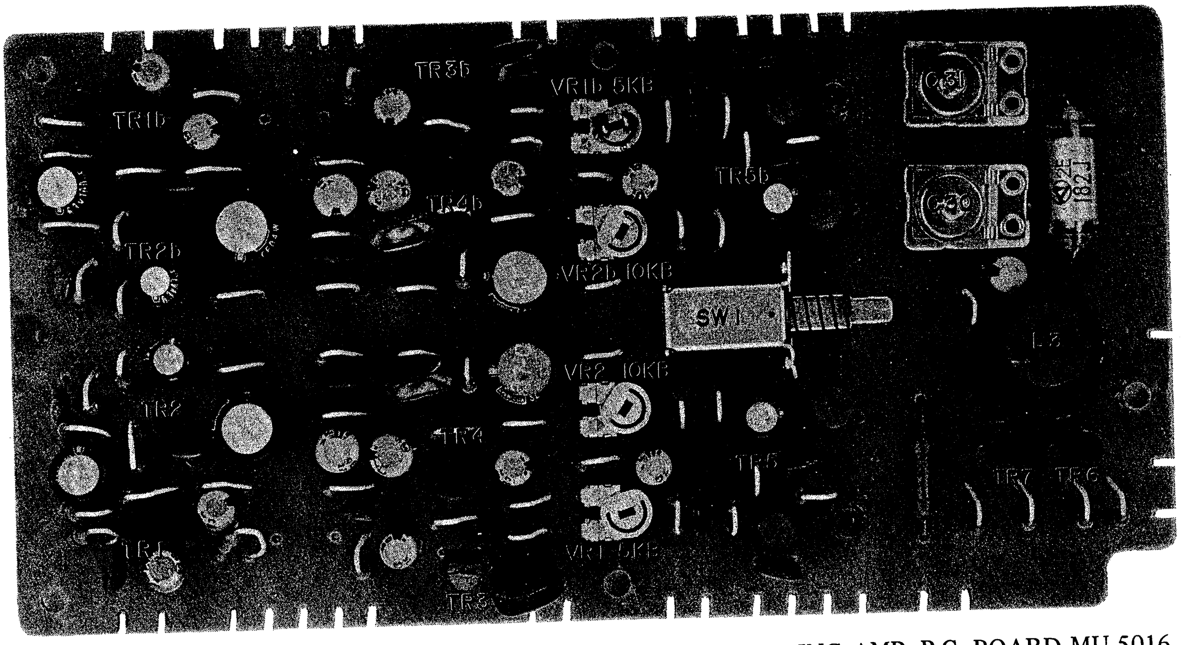

TR3b
VR1b 5KB
TR1b
TR4b
TR5b
TR2b
VR2b 10KB
SW1
L3
VR2 10KB
TR2
TR4
TR5
TR7
TR6
TR1
VR1 5KB
TR3
C31
C30
182J

Fig. 24 RECORDING AMP. P.C. BOARD MU-5016

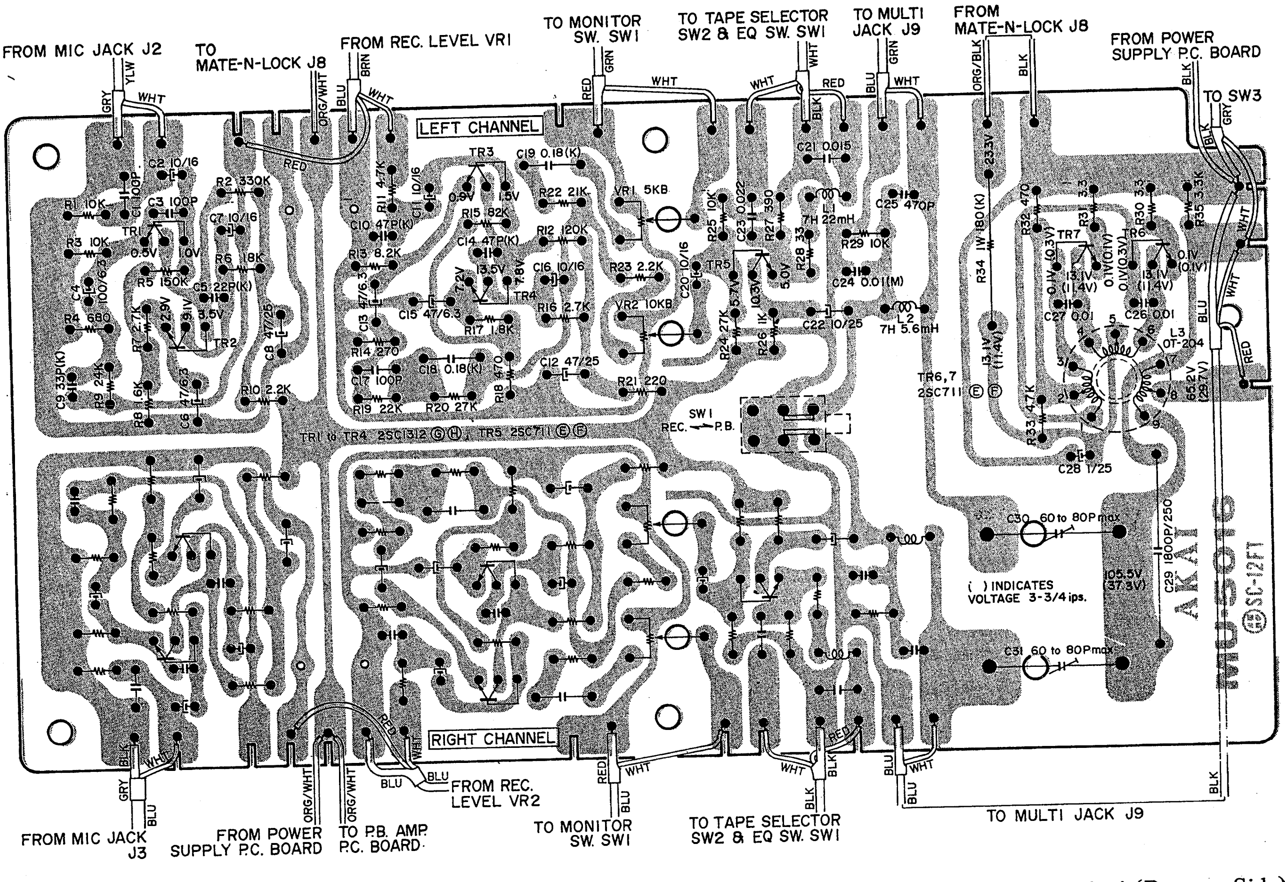

FROM MIC JACK J2
TO MATE-N-LOCK J8
FROM REC. LEVEL VR1
TO MONITOR SW. SW1
TO TAPE SELECTOR SW2 & EQ SW. SW1
TO MULTI JACK J9
FROM MATE-N-LOCK J8
FROM POWER SUPPLY P.C. BOARD
TO SW3
LEFT CHANNEL
RIGHT CHANNEL
GRY
YLW
WHT
RED
BLU
BRN
GRN
BLK
ORG/WHT
ORG/BLK
R1 10K
R2 330K
R3 10K
R4 680
R5 150K
R6 18K
R7 2.7K
R8 6K
R9 24K
R10 2.2K
R11 4.7K
R12 120K
R13 8.2K
R14 270
R15 82K
R16 2.7K
R17 1.8K
R18 470
R19 22K
R20 27K
R21 220
R22 21K
R23 2.2K
R24 27K
R25 10K
R26 1K
R27 390
R28 33
R29 10K
R30 33
R31 3.3
R32 470
R33 4.7K
R34 1W 180(K)
R35 3.3K
C2 10/16
C3 100P
C4 100/6.3
C5 22P(K)
C6 47/6.3
C7 10/16
C8 47/25
C9 33P(K)
C10 47P(K)
C11 10/16
C12 47/25
C13 47/6.3
C14 47P(K)
C15 47/6.3
C16 10/16
C17 100P
C18 0.18(K)
C19 0.18(K)
C20 10/16
C21 0.015
C22 10/25
C23 0.022
C24 0.01(M)
C25 470P
C26 0.01
C27 0.01
C28 1/25
C29 1800P/250
C30 60 to 80Pmax
C31 60 to 80Pmax
L1 7H 22mH
L2 7H 5.6mH
L3 OT-204
VR1 5KB
VR2 10KB
TR1
TR2
TR3
TR4
TR5
TR6
TR7
TR6,7 2SC711 Ⓔ Ⓕ
TR1 to TR4 2SC1312 Ⓖ Ⓗ, TR5 2SC711 Ⓔ Ⓕ
SW1 REC. ⟵ P.B.
0.5V
1.0V
2.9V
3.5V
9.1V
0.9V
1.5V
1.2V
13.5V
7.8V
10.3V
5.0V
23.3V
13.4V (11.4V)
0.1V (0.3V)
0.1V (0.1V)
13.1V (11.4V)
105.5V (37.3V)
85.2V (29.7V)
( ) INDICATES VOLTAGE 3-3/4ips.
MU-5016
AKAI
SC-12F1
FROM MIC JACK J3
FROM POWER SUPPLY P.C. BOARD
TO P.B. AMP P.C. BOARD
FROM REC. LEVEL VR2
TO MONITOR SW. SW1
TO TAPE SELECTOR SW2 & EQ SW. SW1
TO MULTI JACK J9

Fig. 25 RECORDING AMP. P.C. BOARD MU-5016 (Reverse Side)

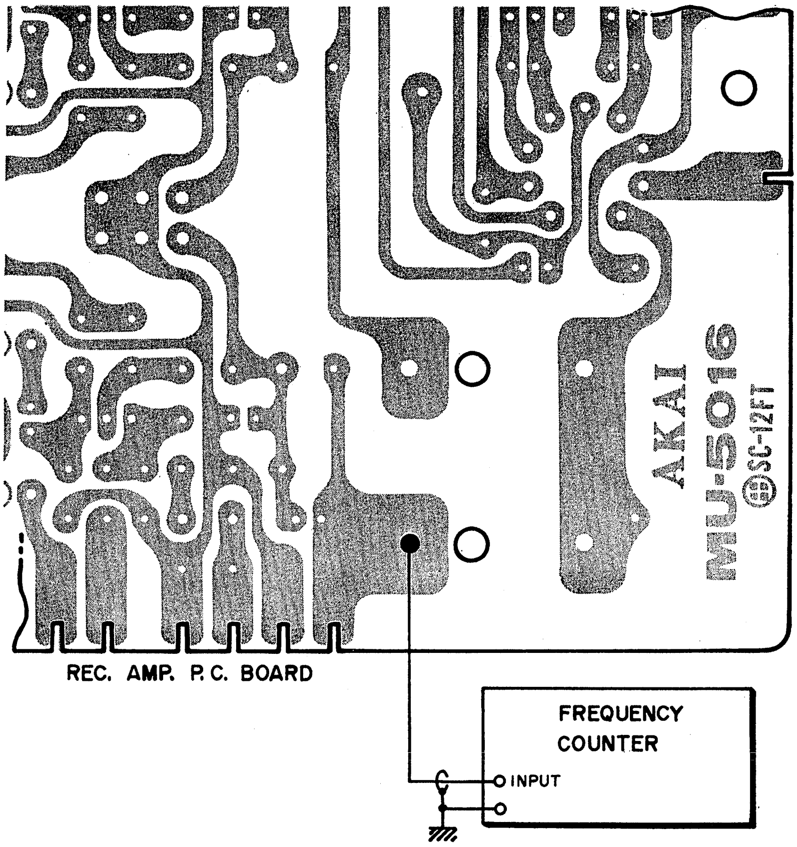


Fig. 26

2. VU METER SENSITIVITY ADJUSTMENT

After playback level adjustments has been completed, with the playback level of both channels at 4 dB, adjust P.B. Amp. P.C. Board semi-fixed resistors VR2 1 kB (left ch.) and VR2b 1 kB (right ch.) shown in Fig. 19 to obtain a left/right VU meter indication of 0 VU.

3. HIGH RANGE FREQUENCY DEVIATION CHECK

1) **Between Channels**
   When an 8,000 Hz 3-3/4 ips. Ampex Alignment Test Tape is played back at 7-1/2 ips, check to confirm that the difference in high range output between left and right channel is within 3 dB at FWD mode and within 4 dB at REV mode.
2) **Between FWD and REV Playback**
   When an 8,000 Hz 3-3/4 ips. Ampex Alignment Test Tape is played back at 7-1/2 ips, check to confirm that the difference in high range output between FWD and REV playback is within 3.5 dB.
3) If in Items 3-1) and 3-2) above, the difference is not within specifications, repeat Head Azimuth Alignment adjustment.

4. RECORDING LEVEL ADJUSTMENT

1) Set Tape Speed Selector to 7-1/2 ips.
2) Set Monitor Switch to TAPE position.
3) Set Left and Right ch. recording level to maximum (turn fully clockwise) and load a blank tape.
4) Set tape deck to recording mode and supply a 1,000 Hz, −70 dB (0.25 mV) sine wave signal to the Mic Inputs from the audio frequency oscillator.
5) Adjust Recording Amp. P.C. Board semi-fixed resistors VR2 10 kB (left ch.) and VR2b 10 kB (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.
6) Set Monitor Switch to SOURCE position.
7) Adjust Recording Amp. P.C. Board semi-fixed resistors VR1 5 kB (left ch.) and VR1b 5 kB (right ch.) shown in Fig. 19 to obtain a high sensitivity V.T.V.M. indication of 4 dB (1.228V) line output level on both channels.

NOTE: In Item 4) above if sine wave is supplied to Line Input, set audio frequency oscillator output to −24.5 dB (46 mV).

5. FREQUENCY RESPONSE ADJUSTMENT

1) Set Tape Speed Selector to 7-1/2 ips.
2) Set Monitor Switch to TAPE position.
3) Set Left and Right ch. recording level to maximum (turn fully clockwise) and load a blank tape.
4) Set tape deck to recording mode and supply a 2,000 Hz sine wave signal to the Mic or Line Inputs. Adjust attenuator to obtain a high sensitivity V.T.V.M. indication of –16 dB (120 mV) line output level.
5) Switch the oscillation frequency of the audio frequency oscillator from the condition described in Item 5-4) above to 20,000 Hz.
6) Adjust Recording Amp. P.C. Board Trimmer Condenser C30 80p max (left ch.) and C31 80p max (right ch.) shown in Fig. 19 until the same high sensitivity V.T.V.M. indication level is obtained on both the left and right channel at the two frequencies described in Items 5-4) and 5-5) above.

6. RECORDING BIAS FREQUENCY MEASURING METHOD

As shown in Fig. 26, connect a Frequency Counter to the output side of the trimmer condenser. Set tape deck to recording mode, and take a frequency counter reading. Specifications are 102 kHz±5%.

VIII. D.C. RESISTANCE OF VARIOUS COIL

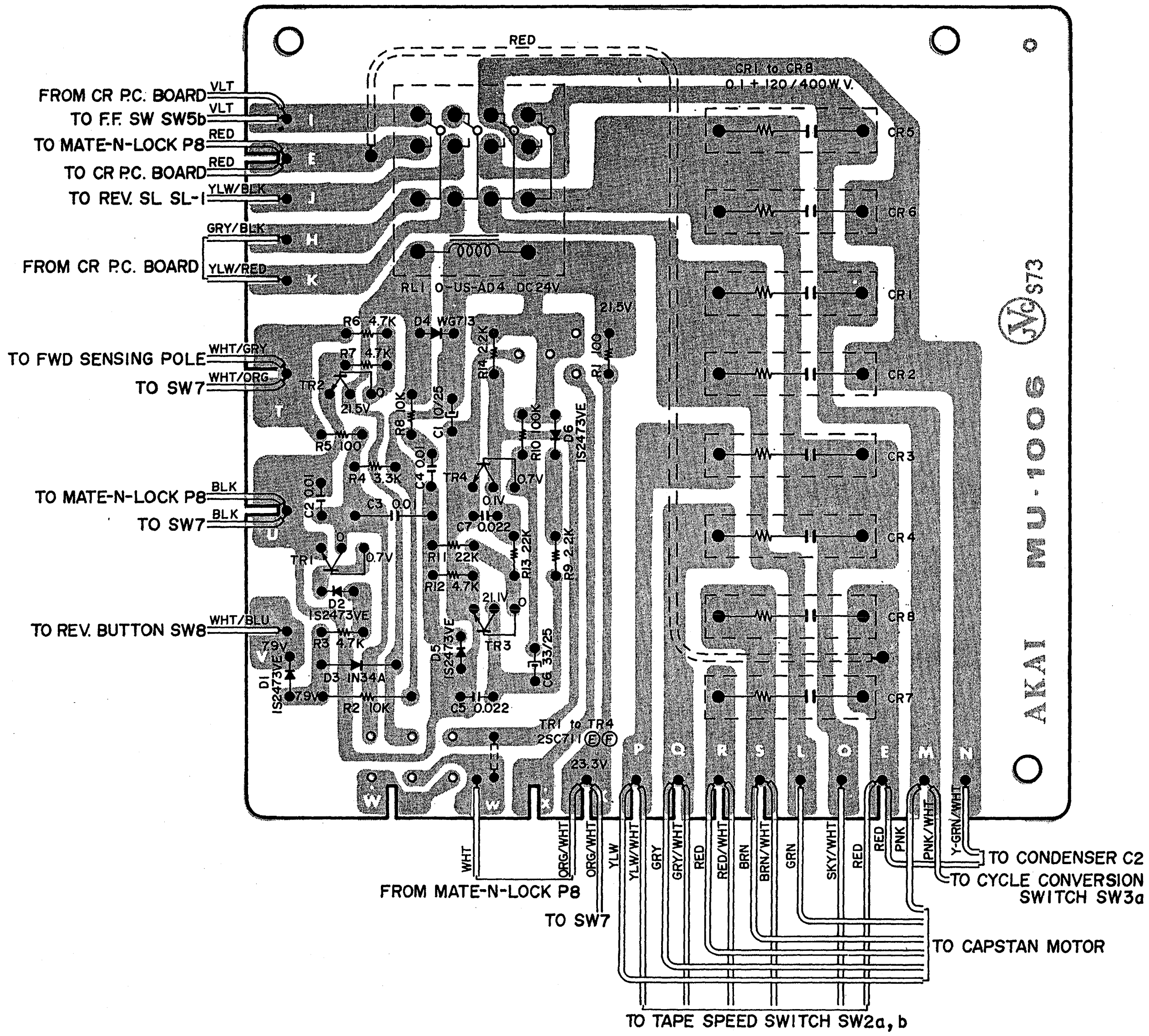
D.C. Resistance shown in chart are average values.

Parts	Designation	D.C. Resistance
CAPSTAN MOTOR	HM-12-16MC	Between PNK-RED 130Ω Between PNK-BRN 180Ω Between GRN-GRY 360Ω Between GRN-YLW 370Ω
REEL MOTOR	24XO-MR	Between RED-BLU 74Ω Between GRN-YLW 166Ω
HEAD REVERSE SOLENOID	RGA-10143	630Ω
REVERSE RELAY	MY4-0-US-AD4 DC24V	650Ω
HEADPHONE OUTPUT TRANSFORMER	5921S	Primary 230Ω Secondary 0.9Ω
OSCILLATOR COIL	OT-204	Between 1-3 0.3Ω Between 4-6 0.7Ω Between 7-9 8.2Ω
COMBO HEAD	RE4-6	5.5Ω (REC) 2.3Ω (ERASE)
PLAYBACK HEAD	P4-202	268Ω

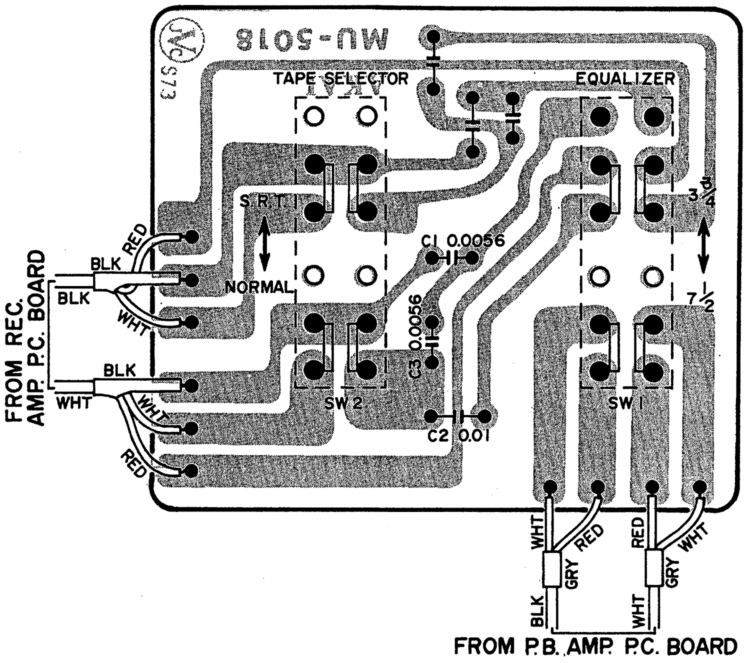
Chart 2

IX. COMPOSITE VIEWS OF COMPONENTS

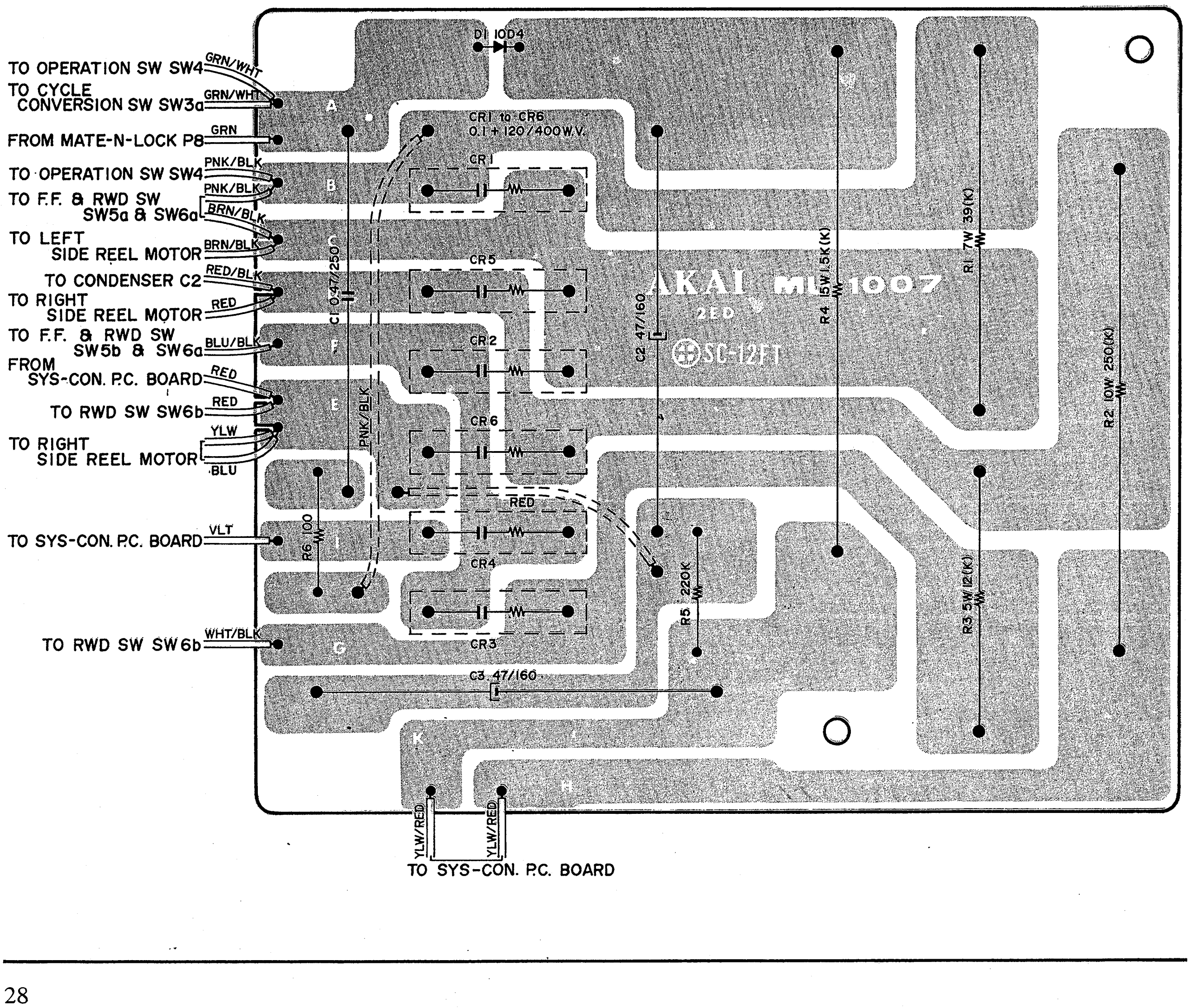
1. SYSTEM CONTROL P.C. BOARD MU-1005


FROM CR P.C. BOARD
VLT
TO F.F. SW SW5b
VLT
TO MATE-N-LOCK P8
RED
TO CR P.C. BOARD
RED
TO REV. SL SL-1
YLW/BLK
GRY/BLK
FROM CR P.C. BOARD
YLW/RED
TO FWD SENSING POLE
WHT/GRY
TO SW7
WHT/ORG
TO MATE-N-LOCK P8
BLK
TO SW7
BLK
TO REV. BUTTON SW8
WHT/BLU
RED
CR1 to CR8
0.1 + 120/400W.V.
CR5
CR6
CR1
CR2
CR3
CR4
CR8
CR7
RL1 O-US-AD4 DC24V
21.5V
R6 4.7K
D4 WG713
R7 4.7K
TR2
21.5V
R14 2.2K
R1 100
R8 10K
C1 10/25
R10 100K
D6 1S2473VE
R5 100
R4 3.3K
C4 0.01
TR4
0.7V
0.1V
C2 0.01
C3 0.01
C7 0.022
TR1
0.7V
R11 22K
R13 22K
R9 2.2K
R12 4.7K
D2 1S2473VE
21.1V
R3 4.7K
D5 1S2473VE
TR3
7.9V
D1 1S2473VE
D3 IN34A
C6 33/25
7.9V
R2 10K
C5 0.022
TR1 to TR4
2SC711 Ⓔ Ⓕ
23.3V
W
W
X
P
Q
R
S
L
O
E
M
N
I
E
J
H
K
T
U
V
WHT
ORG/WHT
ORG/WHT
YLW
YLW/WHT
GRY
GRY/WHT
RED
RED/WHT
BRN
BRN/WHT
GRN
SKY/WHT
RED
RED
PNK
PNK/WHT
Y-GRN/WHT
FROM MATE-N-LOCK P8
TO SW7
TO CONDENSER C2
TO CYCLE CONVERSION SWITCH SW3a
TO CAPSTAN MOTOR
TO TAPE SPEED SWITCH SW2a, b
MU-1006
S73
AKAI

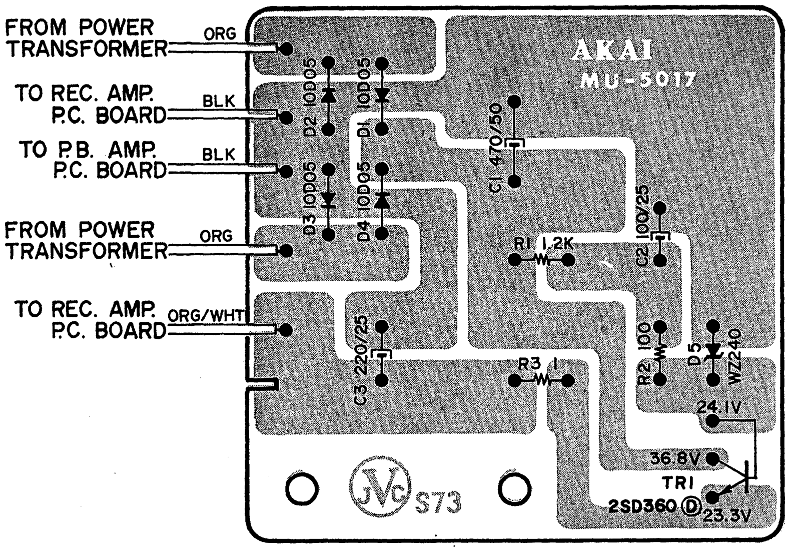
2. EQ. P.C. BOARD MU-5018


MU-5018
S73
TAPE SELECTOR
EQUALIZER
S.R.T.
NORMAL
3¾
7½
C1 0.0056
C3 0.0056
C2 0.01
SW 2
SW 1
RED
BLK
BLK
WHT
BLK
WHT
WHT
RED
FROM REC. AMP. P.C. BOARD
WHT
RED
RED
WHT
GRY
GRY
BLK
WHT
FROM P.B. AMP. P.C. BOARD

3. CR. P.C. BOARD MU-1007


TO OPERATION SW SW4
GRN/WHT
TO CYCLE CONVERSION SW SW3a
GRN/WHT
FROM MATE-N-LOCK P8
GRN
TO OPERATION SW SW4
PNK/BLK
TO F.F. & RWD SW SW5a & SW6a
PNK/BLK
BRN/BLK
TO LEFT SIDE REEL MOTOR
BRN/BLK
TO CONDENSER C2
RED/BLK
TO RIGHT SIDE REEL MOTOR
RED
TO F.F. & RWD SW SW5b & SW6a
BLU/BLK
FROM SYS-CON. P.C. BOARD
RED
TO RWD SW SW6b
RED
YLW
TO RIGHT SIDE REEL MOTOR
BLU
TO SYS-CON. P.C. BOARD
VLT
TO RWD SW SW6b
WHT/BLK
D1 10D4
CR1 to CR6
0.1 + 120/400W.V.
CR1
CR5
CR2
CR6
CR4
CR3
C1 0.47/250
PNK/BLK
RED
R6 100
C2 47/160
C3 47/160
R5 220K
R4 15W 1.5K(K)
R1 7W 39(K)
R3 5W 12(K)
R2 10W 250(K)
AKAI MU-1007
2ED
SC-12FT
A
B
C
D
F
E
I
G
K
H
YLW/RED
YLW/RED
TO SYS-CON. P.C. BOARD

4. POWER SUPPLY P.C. BOARD MU-5017


FROM POWER TRANSFORMER
ORG
TO REC. AMP. P.C. BOARD
BLK
TO P.B. AMP. P.C. BOARD
BLK
FROM POWER TRANSFORMER
ORG
TO REC. AMP. P.C. BOARD
ORG/WHT
AKAI
MU-5017
D2 10D05
D1 10D05
D3 10D05
D4 10D05
C1 470/50
C2 100/25
R1 1.2K
C3 220/25
R3 1
R2 100
D5 WZ240
24.1V
36.8V
TR1
2SD360 Ⓓ
23.3V
JVC
S73

SECTION 2

PARTS LIST

TABLE OF CONTENTS

FIG. 1 MU GX HEAD BLOCK 34
FIG. 2 REEL MOTOR & REEL TABLE BLOCK 36
FIG. 3 MAIN MOTOR BLOCK 38
FIG. 4 FLYWHEEL BLOCK 39
FIG. 5 SWITCH BLOCK 40
FIG. 6 MECHANISM ASSEMBLY BLOCK 41
FIG. 7 SYS. CON. P.C. BOARD (MU-1006) BLOCK 44
FIG. 8 CR P.C. BOARD (MU-1007) BLOCK 45
FIG. 9 REC. AMP. P.C. BOARD (MU-5016) BLOCK 46
FIG. 10 P.B. AMP. P.C. BOARD (ND-5037) BLOCK 47
FIG. 11 EQ. P.C. BOARD (MU-5018) BLOCK 48
FIG. 12 POWER SUPPLY P.C. BOARD (MU-5017) BLOCK . . . 49
FIG. 13 AMPLIFIER ASSEMBLY BLOCK 50
FIG. 14 FINAL ASSEMBLY BLOCK 52
INDEX 54

HOW TO USE THIS PARTS LIST

1. This parts list is compiled by various individual blocks based on assembly process.
2. When ordering parts, please describe parts number, serial number, and model number in detail.
3. How to read List

   The reference number corresponds with illustration or photo number of that particular parts list.

   This number corresponds with the Figure Number.

   This number corresponds with the individual parts index number in that figure.

   A small "x" indicates the inability to show that particular part in the Photo or Illustration.

   12-115x

   Schematic Diagram Number of individual manufactured part. (not required for parts order)

   Quantity of particular part required.

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		FLYWHEEL BLOCK #13		
12-115x	800425	Flywheel Block Assy. Comp.	RDG #13	1
12-116	244506	Flywheel Only	RD-233	1
12-117x	244754	Felt, Flywheel	RD-275	1
12-118	251324	Main Metal Case	RD-236	1
12-119	253080	Main Metal	RD-237	1

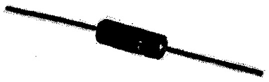
4. The symbol numbers shown on the P.C. Board list can be matched with the Composite Views of Components of the Schematic Diagram or Service Manual.
5. The indications of Resistors and Capacitors in the photos of P.C. Board are being eliminated.
6. The shape of the parts and parts name, etc. can be confirmed by comparing them with the parts shown on the Electrical Parts Table of P.C. Board.
7. Both the kind of part and installation position can be determined by the Parts Number. To determine where a parts number is listed, utilize Parts Index at end of Parts List.

   It is necessary first of all to find the Parts Number. This can be accomplished by using the Reference Number listed at right of parts number in the Parts Index. (meaning of ref. no. outlined in Item 3 above).
8. Utilize separate "Price List for Parts" to determine unit price. The most simple method of finding parts Price is to utilize the reference number.

ELECTRICAL PARTS TABLE

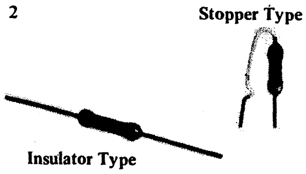
Because the indication of resistors and capacitors in the P.C. Board photos are being eliminated, please confirm parts name and shape by comparing them with the parts shown in this table.

1



Solid Resistor

2

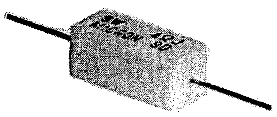


Carbon Resistor

3

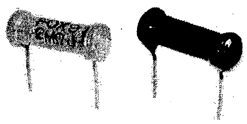
Metal Oxide Film Resistor

4



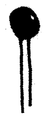
Cement Resistor

5



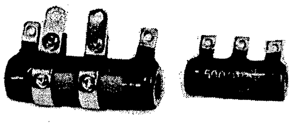
Wire-Wound Resistor

6



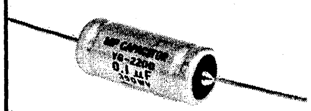
Thermister

7



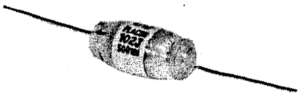
Enamel Resistor

1



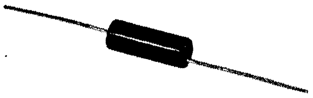
MP Capacitor (Tubular Type)

2



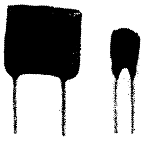
Plastic Capacitor

3



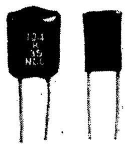
Mylar Capacitor

4



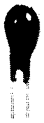
VFM (Hi-Q) Capacitor

5



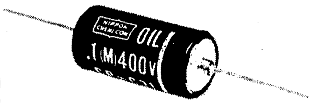
Mylar Capacitor

6



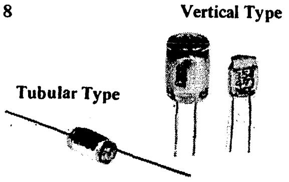
Tantalum Capacitor

7



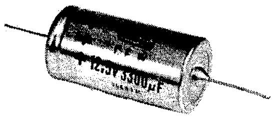
Oil Capacitor (Tubular Type)

8



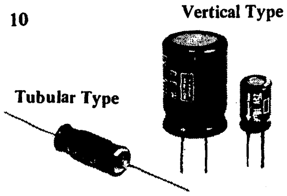
Styrol Capacitor

9



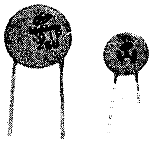
Electrolytic Capacitor (Tubular Type)

10



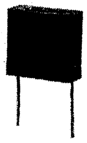
Electrolytic Capacitor

11



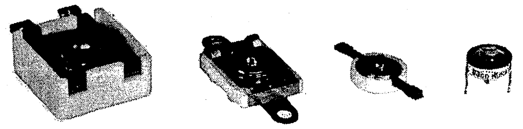
Ceramic Capacitor

12



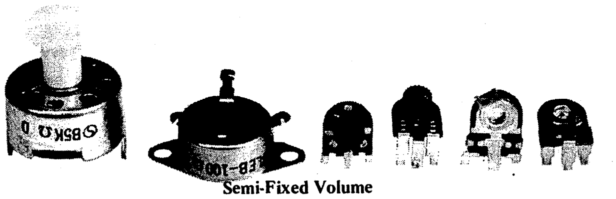
Metalized Mylar (Paper) Capacitor

13



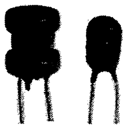
Trimmer Condenser

VR



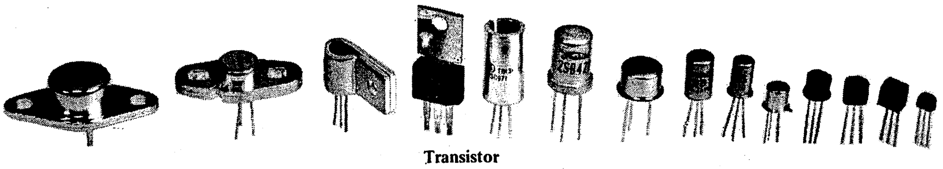
Semi-Fixed Volume

L



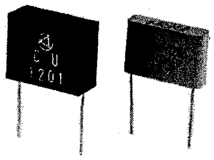
Ferri Inductor

TR



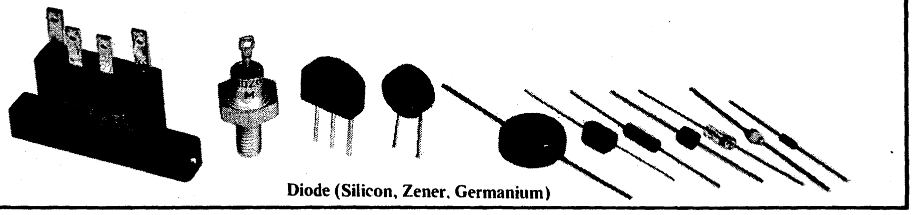
Transistor

CR



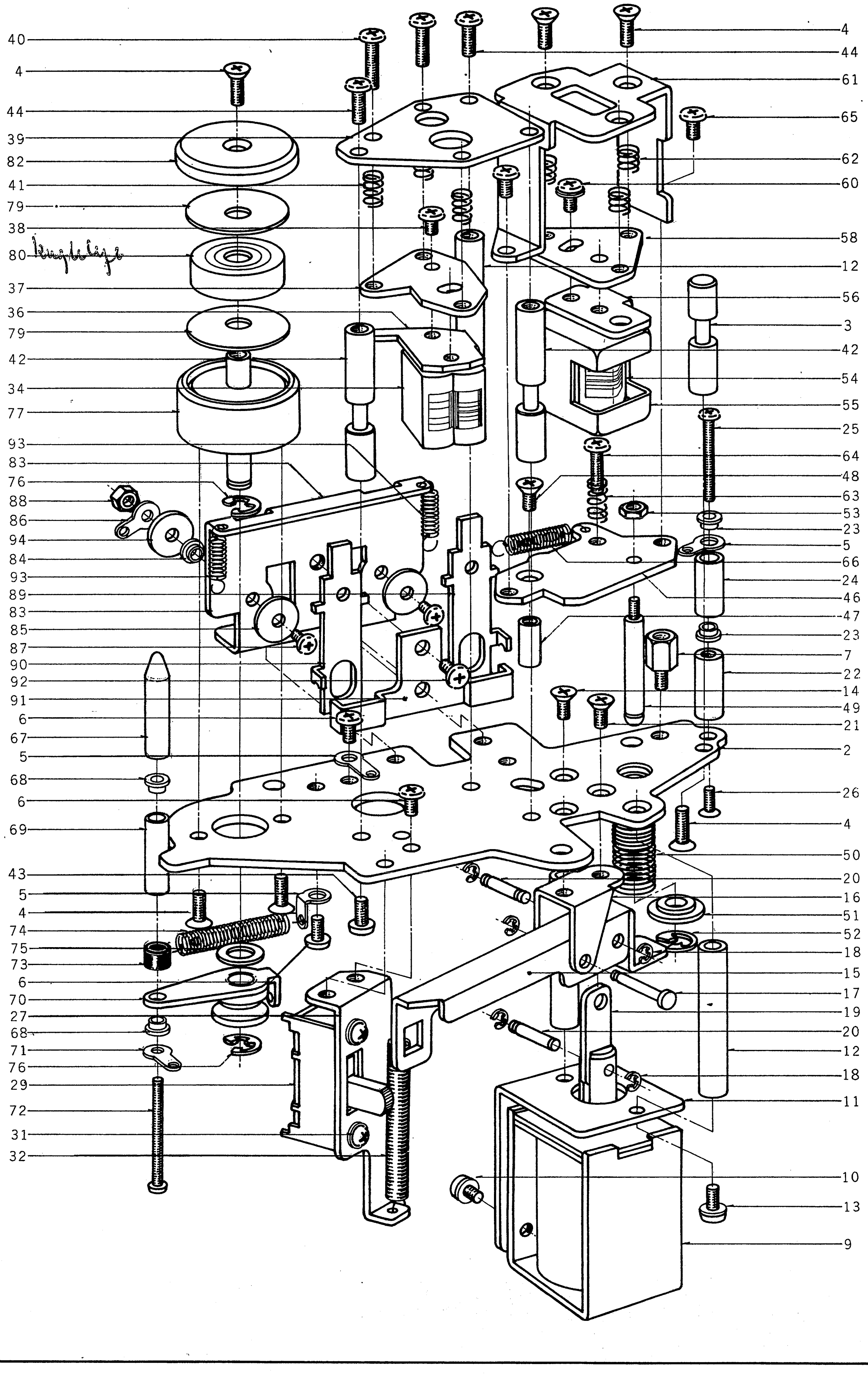
Spark Quencher

D



Diode (Silicon, Zener, Germanium)

FIG. 1 ILLUSTRATION OF MU GX HEAD BLOCK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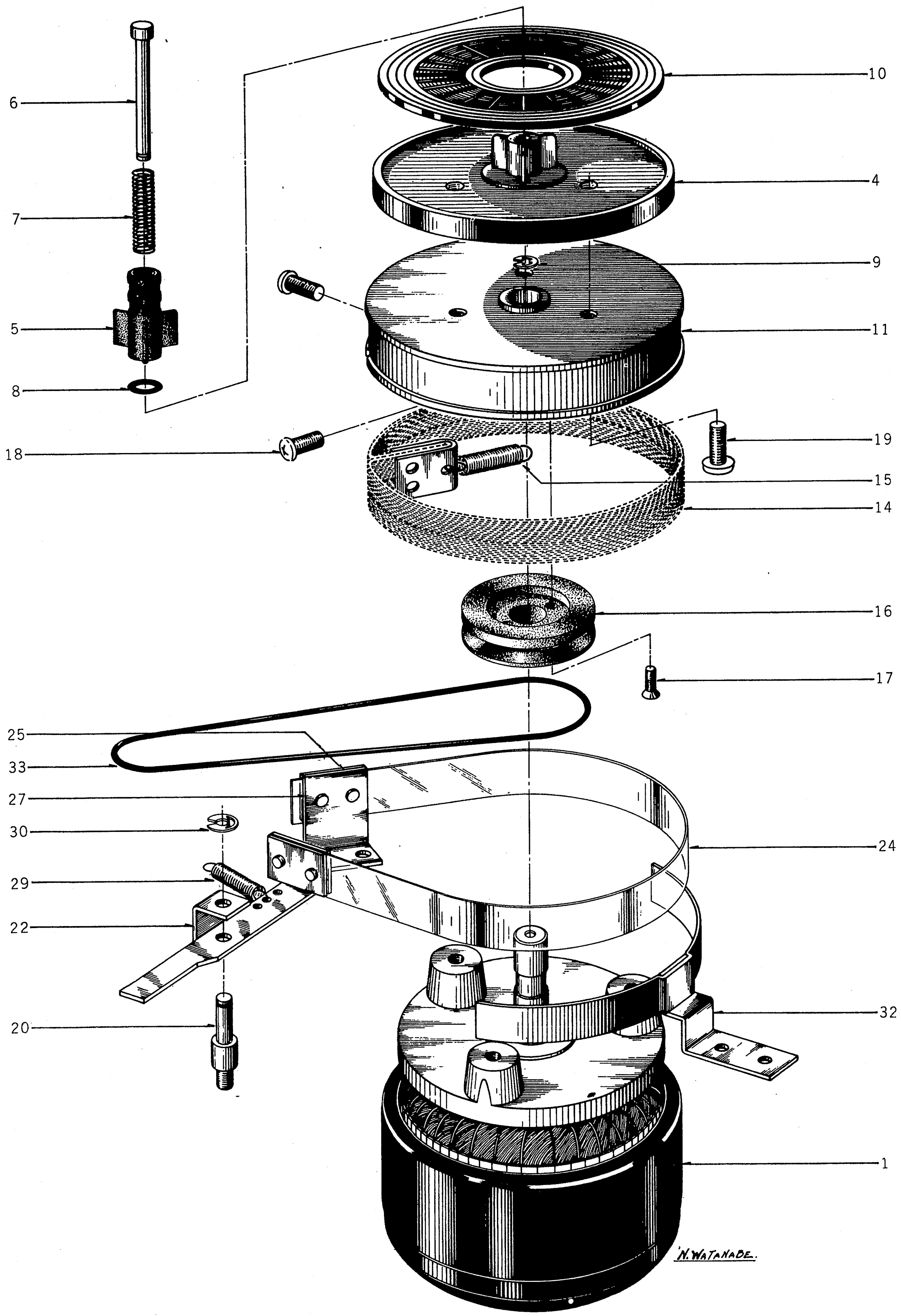
MU GX HEAD BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
1-1x	BH558358	MU GX Head Block Comp.	MU	1
1-2	HZ544498	Head Base, w/metal	MU-0001	1
1-3	HZ317597	Tape Guide A, MR	MR-4	1
1-4	ZS414033	Screw, countersunk head 3x8		7
1-5	ZW273778	Earth Lug M3		4
1-6	ZS323728	Screw, binding head 3x5		5
1-7	HZ541170	Panel Support	MC-0209	1
1-8x	ED224548	Silicon Diode 10D2	45-2-14	1
1-9	EP558123	Plunger Solenoid SDC-840FHT1	44-1-59	1
1-10	ZS555737	ISO Screw, binding head 3x6, w/washer		2
1-11	HZ544252	Solenoid Mt. Plate	MU-0008	1
1-12	MH544195	Head Base Prop	MU-0002	3
1-13	ZS413728	Screw, binding head 3x6, w/washer		2
1-14	ZS200384	Screw, countersunk head 3x6		2
1-15	HL544241	Solenoid Lever	MU-0007	1
1-16	HZ317687	Lever Support	MR-15	1
1-17	MH257477	Connecting Pin	RD-211	1
1-18	ZW270088	'E' Ring 1.9M	6-1-9	5
1-19	HZ544263	Pull Plate	MU-0009	1
1-20	HZ544274	Solenoid Pin	MU-0010	2
1-21	ZS559056	Screw, countersunk head 3x6		2
1-22	HZ455962	Sensing Collar B	MC-1019	1
1-23	HZ317632	Insulator Collar A	MR-36	2
1-24	HZ455973	Sensing Collar A	MC-1018	1
1-25	ZS554916	Screw, binding head 2.3x20		1
1-26	ZS558134	Screw, countersunk head 2.3x5		1
1-27	HZ317733	Slide SW. Base	MR-18	1
1-28x	EA382713	Head Connector P.C. Board	RD-A8	1
1-29	ES317744	Slide SW. SL-242B4V	25-3-28	1
1-30x	ZW317801	Toothed Lock Washer M2.6		2
1-31	ZS372183	Screw, round head 2.6x5		2
1-32	ZG317766	Plunger Lever Spring	MR-19	1
1-33x	HZ583176	RE4-6 Terminal Plate	TW-0035	1
1-34	HR556582	REC./ERASE HEAD RE4-6		1
1-35x	ZS461395	Screw, round head 2x3		2
1-36	HZ544230	Head Mt. Angle	MU-0006	1
1-37	HZ544228	Head Angle Base	MU-0005	1
1-38	ZS417137	Screw, binding head 3x4		2
1-39	HZ544217	Head Mt. Plate	MU-0004	1
1-40	ZS413785	Screw, binding head 3x12		3
1-41	ZG540584	Angle Adjust Spring G	TW-0025	3
1-42	HZ544206	Tape Guide	MU-0003	2
1-43	ZS413741	Screw, binding head 3x8		3
1-44	ZS396044	Screw, binding head 3x8		3
1-45x	ZW430863	Washer (SPC)D3.3x6x0.5t		2
1-46	HZ531551	Base Plate B	MR-10	1
1-47	HZ298012	4-TR Hold-down Base Guide	3A-69	1
1-48	ZS554938	Screw, countersunk head 2.3x6		1
1-49	HZ541135	PH Shaft	MC-0205	1
1-50	ZG317902	PH Spring	MR-13	1
1-51	ZW317913	Spring Holder	MR-12	1
1-52	ZW290283	'U' Ring 2.85M	6-1-1	1
1-53	ZW554940	Nut M3		1
1-54	HP536501	P.B. HEAD P4-202		1
1-55	HZ411017	Head Shield Case	LF-0005	1
1-56	HZ541124	Head Mt. Angle	MC-0204	1
1-57x	ZS460440	Screw, pan head 2x4		2
1-58	HZ541113	Angle Base	MC-0203	1
1-59x	EA463206	Terminal P.C. Board A	RD-A36	2
1-60	ZS558257	Screw, binding head 3x5, w/washer		2
1-61	HZ541102	Base Angle	MC-0203	1
1-62	ZG317968	Angle Spring	MR-14	3
1-63	ZG466312	Angle Adjust Spring E	BS-0018	1
1-64	ZS425114	Screw, round head 3x10		1
1-65	ZS384131	Screw, round head 3x5		2
1-66	ZG317777	Pull Spring	MR-47	1
1-67	HZ541181	Sensing Post B	MC-0210	1
1-68	HZ317632	Insulator Collar A	MR-36	2
1-69	HZ318047	Sensing Collar A	MR-35	1
1-70	HZ318036	Tension Arm, w/pulley	MR-37	1
1-71	ZW316800	Earth Lug M2.6		1
1-72	ZS554962	Screw, pan head 2.3x25		1
1-73	HZ467010	Cushion Rubber, MC	MC-0004	1
1-74	ZG317114	Tension Lever Spring	MR-39	1
1-75	ZW259885	Washer (PBP)D5.1x10.3x0.1t		1
1-76	ZW270123	'E' Ring 4M	6-1-9	2
1-77	HZ547751	Tape Guide A, w/shaft	MU-0015	1
1-78x	MS318093	Guide Roller Shaft	MR-30	1
1-79	ZW231805	Tape Guide Washer (large)	3A-356	2
1-80	MV248117	Bearing 635AHZZMC1ERB32		1
1-81x	ZW326463	Washer (PBP)D5.1x10.3x0.2t		1
1-82	HZ317092	Tape Guide Table B	MR-32	1

MECH. ASSEMBLY BLOCK

1-83	ML544285	D.S Table	MU-0011	1
1-84	MZ316822	Insulator Collar B	MR-225	2
1-85	HZ542092	Insulator Washer	MC-0213	2
1-86	ZW316800	Earth Lug M2.6		2
1-87	ZS464692	Screw, binding head 2.3x6		2
1-88	ZW273688	Nut M2.3		2
1-89	HL541168	D.S Lever A	MC-0208	1
1-90	HL542687	D.S Lever B	MC-0208	1
1-91	HL541157	D.S Lever Support	MC-0207	1
1-92	ZS417137	Screw, binding head 3x4		2
1-93	ZG317777	Pull Spring	MR-47	2
1-94	ZW563218	Washer (Bake)D3.2x10x1t		2
1-95x	ZS558101	Screw, pan head 3x6, w/washer		2

FIG. 2 ILLUSTRATION OF REEL MOTOR & REEL TABLE BLOCK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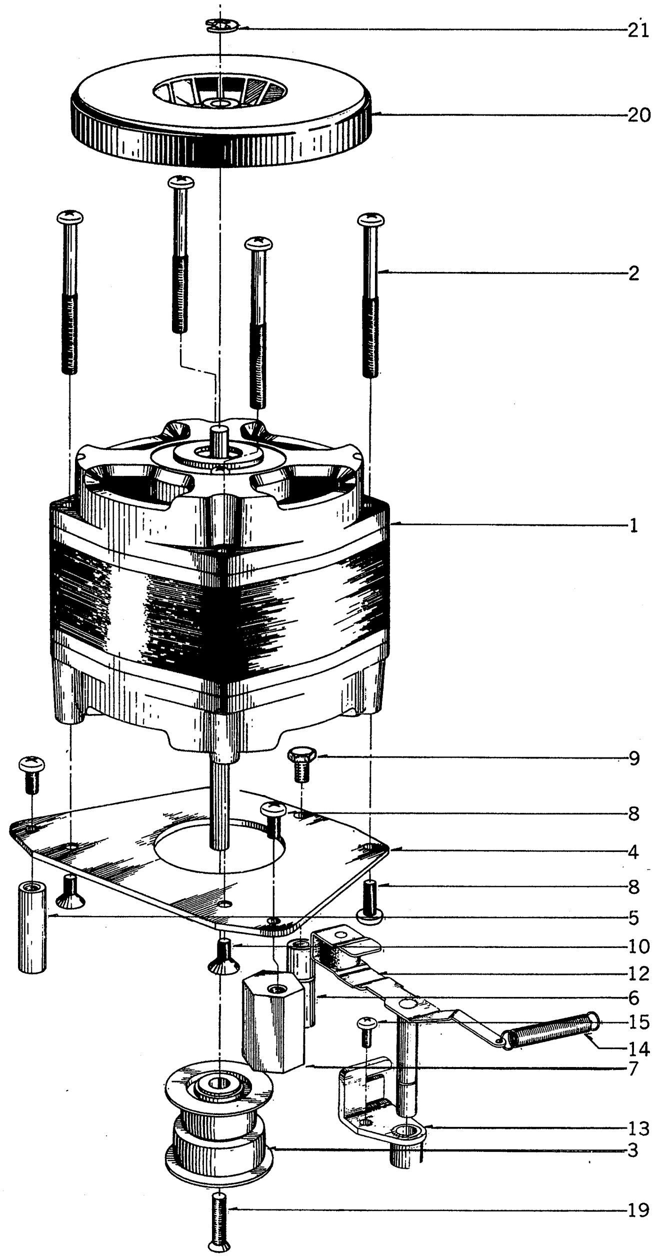
REEL MOTOR & REEL TABLE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
2-1	BM314741	Reel Motor Block (24XO-2) Comp.	MR,KD,MS,MC	1
2-2x	BR317395	Supply Reel Table Block Comp.	MU,MC,MR	1
2-3x	BR317384	Take-up Reel Table Block Comp.	MU,MR	1
2-4	MT317441	Reel Table, MR	MR-215	2
2-5	MT255420	Reel Retainer	3R-102	2
2-6	MS342000	Reel Shaft	3R-108	2
2-7	ZG255633	Reel Spring	3R-109	2
2-8	MT297663	3R 'O' Ring 2.9x1.65M	3R-139	2
2-9	ZW270088	'E' Ring 1.9M	6-1-9	2
2-10	MT317463	Reel Table Rubber, MR	MR-250	1
2-11	MT317452	Brake Drum (R) (Take-up)	MR-216	1
2-12x	MT325473	Brake Drum (L) (Supply)	MR-216	1
2-13x	ZW273778	Earth Lug M3		2
2-14	MT436860	Brake Cloth Comp.	MR-269	2
2-15	ZG317496	Felt Tension Spring	MR-260	2
2-16	MR317507	Counter Pulley (Take-up)	MR-217	1
2-17	ZS365973	Screw, countersunk head 2.3x12		2
2-18	ZS424056	Screw, pan head 4x10		4
2-19	ZS413785	Screw, binding head 3x12		6
	MECH. ASSEMBLY BLOCK			
2-20	MH317373	Brake Lever Prop	MR-102	2
2-21x	ZW416698	Nut M4		2
2-22	ML314976	Brake Lever A (Take-up)	MR-210	1
2-23x	ML396810	Brake Lever B (Supply)	KD-1038	1
2-24	MT314987	Brake Band	MR-213	2
2-25	MZ314998	Brake Band Retaining Plate	MR-212	4
2-26x	ZS417137	Screw, binding head 3x4		6
2-27	MZ315000	Brake Band Support	MR-214	2
2-28x	ZS425981	Screw, binding head 3x3		2
2-29	ZG315011	Brake Lever Spring	MR-116	2
2-30	ZW290283	'U' Ring 2.85M	6-1-1	2
2-31x	ZS323728	Screw, binding head 3x5		8
2-32	MZ317406	Brake Band Guide, w/base	MR-120	2
2-33	MB230286	Timer Belt D74x1.4 (Counter)	3A-120	1

FIG. 3 ILLUSTRATION OF MAIN MOTOR BLOCK

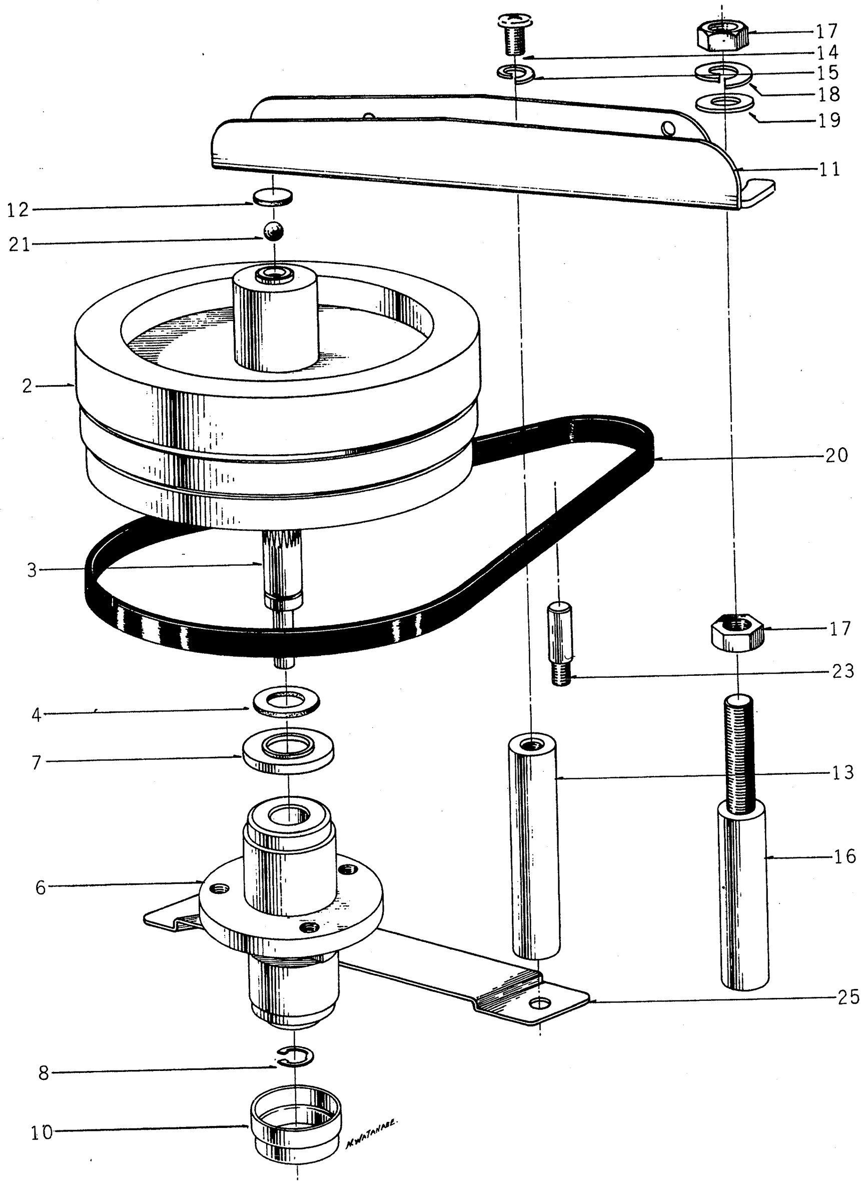


MAIN MOTOR BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	MAIN MOTOR BLOCK			
3-1	BM563196	Main Motor Block (HM2-16MU) Comp.	MU	1
3-2	ZS427037	Screw, pan head 4x50, w/washer		4
3-3	MR540876	Motor Pulley Comp.	MC-7201	1
3-4	MZ316293	Motor Mt. Plate, MR	MR-717	1
3-5	MH254160	Motor Prop A	24X-730	1
3-6	MZ254182	Motor Prop B	24X-731	1
3-7	MH316304	Motor Prop, MR	MR-706	1
3-8	ZS424056	Screw, pan head 4x10		4
3-9	ZS272395	Motor Prop Retaining Screw, M-7	24X-732	1
3-10	ZS427026	Screw, countersunk head 4x10		2
	BELT CHANGE LEVER BLOCK			
3-11x	BL555344	Belt Change Lever Block Comp.	MU,MC-2	1
3-12	ML540990	Belt Change Lever, w/roller	MC-1207	1
3-13	ML541001	Belt Change Lever Stopper, w/metal	MC-1208	1
3-14	ZG217337	Belt Return Spring	4TR-224	1
3-15	ZS417150	Screw, pan head 4x6		1
3-16x	ZG217394	Belt Change Spring B	MH-125	1
3-17x	ZW260054	Washer (SUP)D6.1x10x0.25t		1
3-18x	ZW290283	'U' Ring 2.85M	6-1-1	1
3-19	ZS203016	Screw, oval countersunk head 3x15		1
3-20	SZ529108	Main Motor Fan	ND-7010	1
3-21	ZW270134	'E' Ring 5M	6-1-9	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 4 ILLUSTRATION OF FLYWHEEL BLOCK



FLYWHEEL BLOCK

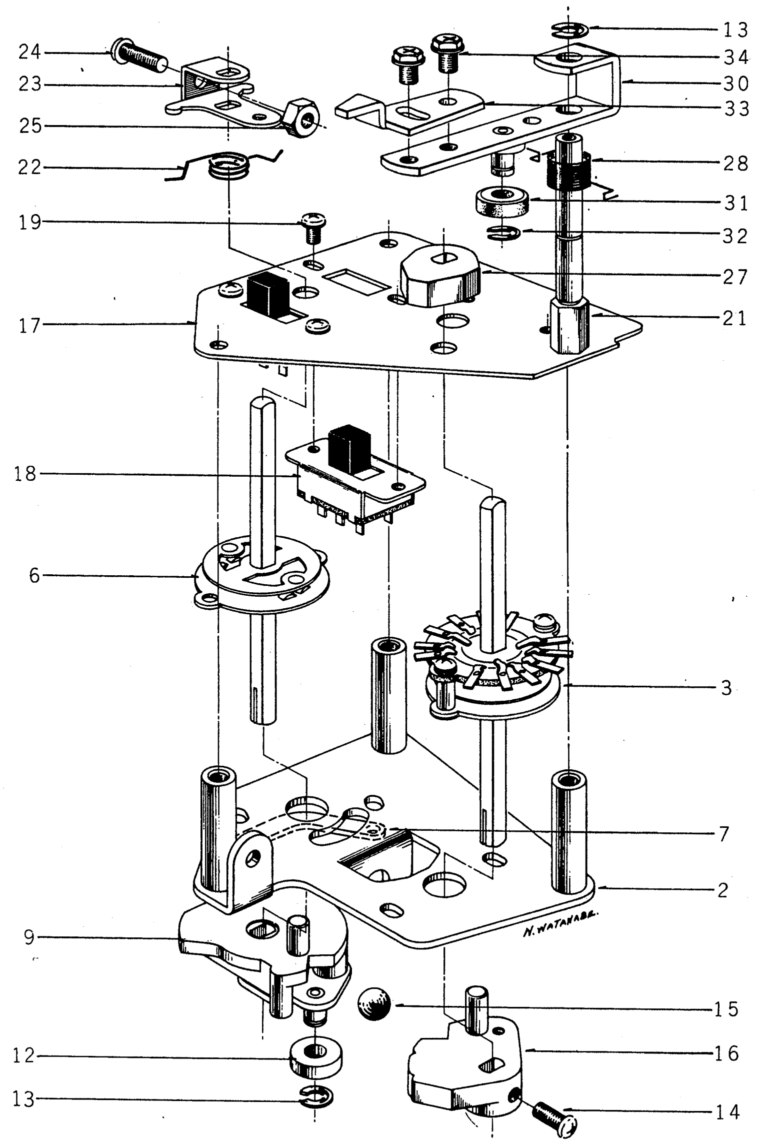
Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-1x	BF476550	Flywheel Block Comp.	MR-2,MS-2,3	1
4-2	MI296245	Flywheel 24	MH-202	1
4-3	MS476572	Main Shaft, D6	MR-2005	1
4-4	ZW447208	Flywheel Thrust B D7.9x13x0.5t	101025	1
4-5x	ZS373577	Set Screw, hexagon socket 5x6(flat)		2
4-6	MZ296256	Main Case A 24, w/metal	MH-206	1
4-7	MZ446635	Thrust Cap, Main Metal B2	LF-2006	1
4-8	MH244710	Flywheel Fixing Pin	900-250	1
4-9x	MZ244113	Felt D12.5x16x2t		1
4-10	MZ253113	Main Metal Cap B	MH-208	1

MECH. ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-11	MZ314897	Flywheel Support Plate, MR	MR-121	1
4-12	ZW392681	Washer (Nylon)D8x1t (without hole)		1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
4-13	MH273036	Flywheel Prop A, M-9	M9-310	1
4-14	ZS413201	Screw, pan head 4x8		1
4-15	ZW273914	Spring Washer M4		3
4-16	MH273047	Flywheel Prop B, M-9	M9-311	1
4-17	ZW413280	Inch Nut 1/4" mountain 20		2
4-18	ZW393232	Spring Washer 1/4"		1
4-19	ZW413998	Washer (SUP)D6.8x12.7x1t		1
4-20	MB541012	Drive Belt (Flat) D116.9x1.6x7	MC-1209	1
4-21	MV269965	Steel Ball D4		1
4-22x	ZS424056	Screw, pan head 4x10		2
4-23	MH248343	Belt Guide Pin	4TR-109	1
4-24x	ZW416698	Nut M4		1
4-25	MZ439525	Flywheel Belt Holding Plate B	MS-1014	1
4-26x	ZS439514	Screw, binding head 3x18		1
4-27x	ZW273756	Nut M3		1

FIG. 5 ILLUSTRATION OF SWITCH BLOCK



SWITCH BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
	SWITCH BLOCK			
5-1x	BS558336	Switch Block Comp.	MU	1
5-2	HZ402390	SW. Table A-2, MR (w/prop)	MR-201	1
5-3	ES316923	Play Shaft (Y type) Y-133	25-8-6	1
5-4x	ZW273802	Toothed Lock Washer M3		2
5-5x	ZW273756	Nut M3		2
5-6	ES316934	Rewind Shaft (Y type)	25-8-5	1
5-7	MZ316945	Nut Plate	MR-245	1
5-8x	ZS413728	Screw, binding head 3x6, w/washer		2
5-9	MZ316956	Cam A-3, w/plate	MR-242	1
5-10x	ZW259942	Washer (Fiber)D5.1x10.3x0.5t		1
5-11x	ZW376402	Washer (Fiber)D5.1x10.3x1t		2
5-12	MR269730	Cam Roller D12	900-213	1
5-13	ZW290283	'U' Ring 2.85M	6-1-1	2
5-14	ZS413201	Screw, pan head 4x8		3
5-15	MV270066	Steel Ball D8		1
5-16	MZ405483	Cam B-1, w/tap	900-206	1
5-17	MZ544364	Control Chassis	MU-2001	1
5-18	ES479485	Slide SW. S-1	25-3-66	2
5-19	ZS371856	ISO Screw, binding head 3x5		4
5-20x	ZS559045	Screw, binding head 4x8, w/washer		2
5-21	MH317046	REC. Lever Prop	MR-206	1
5-22	ZG225516	SW. Spring	MR-255	1
5-23	MZ317024	SW. Cam	MR-204	1
5-24	ZS424056	Screw, pan head 4x10		1
5-25	ZW416698	Nut M4		1
5-26x	ZS323728	Screw, binding head 3x5		3
5-27	MZ317068	Amp. SW. Cam B	MR-243	1
5-28	ZG227564	Spring H	900-120	1
	SWITCH LEVER BLOCK			
5-29x	BL204480	Switch Lever Block Comp.	MR	1
5-30	ML226080	SW. Lever A, w/shaft B	900-255	1
5-31	MR217203	Cam Roller A (Nylon)D12	900-153	1
5-32	ZW290283	'U' Ring 2.85M	6-1-1	1
5-33	ML226124	SW. Lever B	900-256	1
5-34	ZS437545	Hexagon Bolt 4x7, w/washer		2
5-35x	MZ256814	Rewind Shaft Spacer	M9-124	2

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

FIG. 6 (A) ILLUSTRATION OF MECHANISM ASSEMBLY BLOCK

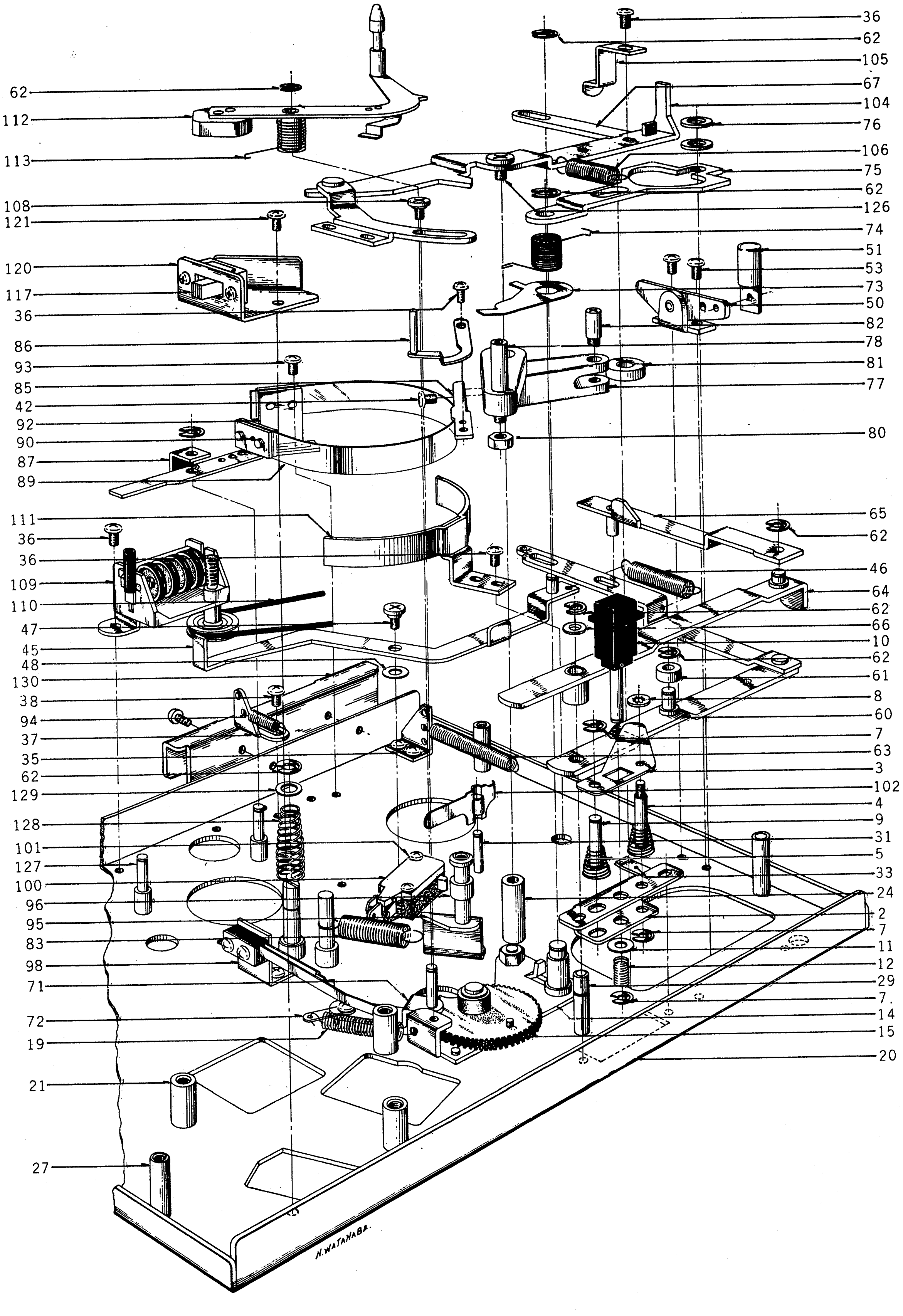

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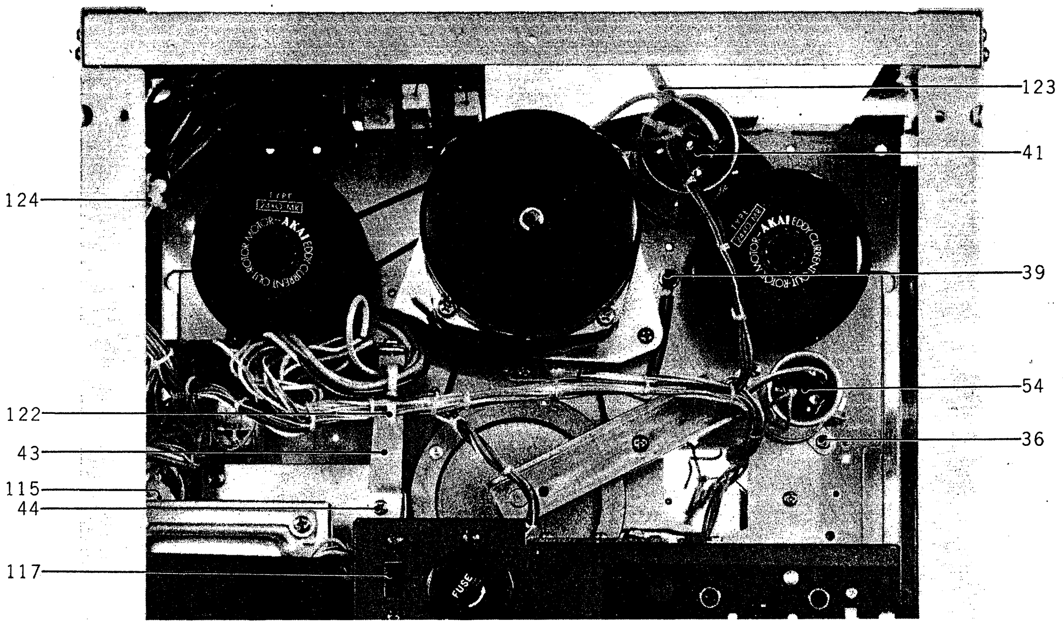
FIG. 6 (B) PHOTO OF MECHANISM ASSEMBLY BLOCK



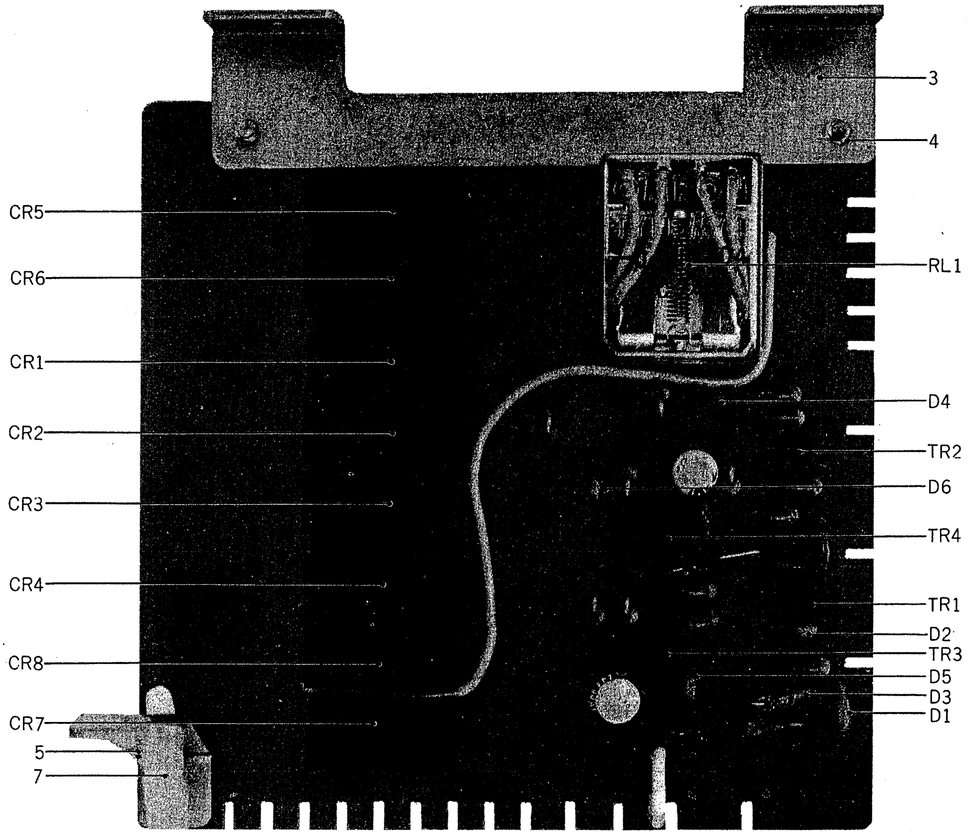
MECHANISM ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
		REC. BUTTON BLOCK		
6-1x	BZ558347	REC. Button Block Comp.	MU-1,2	1
6-2	MZ316708	Stopper Table	MR-219	1
6-3	MZ316710	Cam Stopper	MR-220	1
6-4	MS316721	Stopper Shaft	MR-221	1
6-5	ZG316732	Cone Spring	MR-244	2
6-6x	ZW322525	Washer (PBP)D4.1x7x0.2t		1
6-7	ZW290283	'U' Ring 2.85M	6-1-1	4
6-8	ZW432944	Push Nut 3x10x0.3t		1
6-9	MS316776	Stopper Shaft B	MR-259	1
6-10	SK543857	REC. Button B	MR-222	1
6-11	ZW419646	Washer (SPC)D4.5x9.8x0.5t		1
6-12	ZG316765	REC. Button Spring	MR-252	1
		ECCENTRIC GEAR BLOCK		
6-13x	BZ248027	Eccentric Gear Block Comp.	MU,MC,MS	1
6-14	MZ248016	Eccentric Gear Table, w/shaft	4TR-243	1
6-15	MZ248005	Eccentric Gear	4TR-245	1
6-16x	ZW861344	Washer (PBP)D6.1x10x0.4t		1
6-17x	ZW260144	Washer (Nylon)D6.1x10x0.3t		1
6-18x	ZW290283	'U' Ring 2.85M	6-1-1	1
6-19	ZG437253	Eccentric Gear Return Spring	MS-2022	1
		MECH. ASSEMBLY BLOCK		
6-20	MZ317340	MR Mech. Frame, w/pin	MR-101	1
6-21	MH247533	Head Prop E	100012	3
6-22x	ZS413201	Screw, pan head 4x8		2
6-23x	ZS414044	Screw, countersunk head 4x8		1
6-24	MS317362	Pinch Roller Arm Shaft	MR-125	1
6-25x	ZW274026	Spring Washer M5		1
6-26x	ZW413278	Nut M5		1
6-27	MH273295	Mech. Panel Prop, M-9	M9-302	2
6-28x	ZS421806	Screw, pan head 3x8		2
6-29	MS260515	A Lever Shaft	900-126	1
6-30x	ZW413267	Flange Nut M4		1
6-31	MS250536	Micro Lever Shaft	3A-239	1
6-32x	ZW273688	Nut M2.3		1
6-33	MZ217697	Pause Lever Stopper Plate	M9-113	1
6-34x	MZ256814	Rewind Shaft Spacer	M9-124	2
6-35	MZ227340	Spring Rack B	900-172	1
6-36	ZS323728	Screw, binding head 3x5		20
6-37	MZ314605	Spring Rack, MR	MR-104	2
6-38	ZS425981	Screw, binding head 3x3		4
6-39	ZS413212	Screw, binding head 3x5, w/lug		1
6-40x	MZ452496	Çycle Angle (CEE, CSA)	LS-1007	1
6-41	EC520626	MP/C. (3+1)µFx2 250WVAC (Lug type)	24-9-74	1
6-42	ZS413223	Screw, binding head 3x5, w/washer		4
6-43	MZ544331	P.C. Board Holder B	MU-1004	1
6-44	ZS413155	Screw, binding head 3x6		2
6-45	ML314684	Brake Lever C, w/pin	MR-227	1
6-46	ZG314706	Spring IB	MR-115	1
6-47	ZS314717	Graduated Screw, MR	MR-254	1
6-48	ZW432347	Washer (Luminar) D6.2x13x0.125t		1
6-49x	ZW273756	Nut M3		1
6-50	ML226258	Start Lever A, w/lever B-2	4TR-122	1
6-51	SB425777	Start Button D	MS-1002	1
6-52x	ZW314728	Cotter Pin 1.6x8		1
6-53	ZS425788	Screw, round head 3x4		2
6-54	EC442056	MP/C. 2+1µF 250WVAC (Lug type)	24-9-61	1
6-55x	EC536938	MP/C. 2µF 250WVAC (Lug type) (CSA)	24-9-78	1
6-56x	ZW330412	Adjust Washer (U) D4x13x0.13t		1
6-57x	ZW330423	Adjust Washer (U) D4x13x0.25t		1
6-58x	ZW330434	Adjust Washer (U) D4x13x0.5t		1
6-59x	ZW330445	Adjust Washer (U) D4x13x0.8t		1
6-60	ML314763	Lever B, MR (w/lever D)	MR-122	1
6-61	MR314785	Cam Roller D9	MR-237	1
6-62	ZW290283	'U' Ring 2.85M	6-1-1	5
6-63	ZG314818	D Lever Spring	MR-114	1
6-64	ML334506	Lever A, MR (w/metal)	MR-126	1
6-65	ML314842	C Lever, MR (w/pin)	MR-108	1

When ordering parts, please describe Parts Number, Serial Number, and Model Number in detail.

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
6-66	ZW419826	Washer (Fiber)D6.2x10x1t		2
6-67	ML314864	IB Lever	MR-111	1
6-68x	ZW259705	Washer (BSP)D4.1x13x1t		1
6-69x	ZS207314	Amp. Lever Set Screw	3A-737	1
6-70x	ZW259885	Washer (PBP)D5.1x10.3x0.1t		1
6-71	MZ549426	AS Lever Prop Table B, w/prop	MC-1214	1
6-72	ZS202116	Screw, binding head 3x5, w/lug		1
6-73	MZ218125	Gear Stopper	4TR-120	1
6-74	ZG226697	Stopper Spring	4TR-121	1
6-75	ML228868	Auto. Mech. Control Lever	4TR-125	1
6-76	ZW260087	Washer (Fiber)D6.1x10x0.5t		1
6-77	ML314932	Pinch Roller Lever, MR	MR-119	1
6-78	MS243404	Pinch Roller Shaft C	4TR-102	1
6-79x	ZW259975	Washer (SUP)D5.1x10.3x0.8t		1
6-80	ZW416698	Nut M4		1
6-81	MR269763	Cam Roller D13	900-154	1
6-82	MS582906	Cam Roller Shaft A-1	7-3-6	1
6-83	ZG455692	Pinch Roller Spring, MS	MS-1015	1
6-84x	ZW314943	Washer (Nylon)D8	MR-113	1
6-85	ML314954	Shifter Lever A	MR-117	1
6-86	ML544353	Shifter Lever, w/pin	MU-1008	1
6-87	ML314976	Brake Lever A (Take-up)	MR-210	1
6-88x	ML396810	Brake Lever B (Supply)	KD-1038	1
6-89	MT314987	Brake Band	MR-213	2
6-90	MZ314998	Brake Band Retaining Plate	MR-212	4
6-91x	ZS417137	Screw, binding head 3x4		6
6-92	MZ315000	Brake Band Support	MR-214	2
6-93	ZS425981	Screw, binding head 3x3		2
6-94	ZG315011	Brake Lever Spring	MR-116	1
6-95	HZ315077	Reverse Guide Base, w/prop	MR-229	1
6-96	HZ315090	Reverse Guide	RD-225	1
6-97x	ZS344463	Set Screw, hexagon socket 4x6(cup)		1
6-98	ES546794	Tension SW. Comp.	MU-1012	1
6-99x	ZS427048	Screw, round head 3x3		2
6-100	ES562465	Micro SW. K-1	25-1-26	1
6-101	ZS417148	Screw, binding head 3x15		2
6-102	ML316394	Operation SW. Lever	MR-112	1
6-103x	ZW270088	'E' Ring 1.9M	6-1-9	1
6-104	ML316427	Pause Lever, MR (w/lever B)	MR-233	1
6-105	MZ316451	Pause Stopper, M-7	MH-126	1
6-106	ZG301061	Pause Spring 990A	4TR-128	1
6-107x	ZW260010	Washer (PBP)D6.1x10x0.1t		1
6-108	ZS207314	Amp. Lever Set Screw	3A-737	1
6-109	MC316473	Counter MP-491-17 (MD-481-17)	9-1-8	1
6-110	MB230286	Timer Belt D74x1.4(Counter)	3A-120	1
6-111	MZ317406	Brake Band Guide, w/base	MR-120	2
6-112	BL316484	AS Lever Comp.	MR,MS,MC	1
6-113	ZG260706	AS Lever Spring	4TR-118	1
6-114x	MP271170	Pinch Roller, LC D=38	LC-321	1
6-115	EJ450573	Mate-N-Lock Cap Housing 9P 1-480277-0	52-1-7	1
6-116x	EJ373623	Pin Contact 61116-1	52-1-1	9
6-117	ES375478	Slide SW. ESD-279DU(black)	25-3-23	2
6-118x	ES479485	Slide SW. S-1 (EC, CSA)	25-3-66	1
6-119x	ZS444273	ISO Screw, binding head 3x4		4
6-120	ML544307	SW. Retaining Plate S	MU-1001	1
6-121	ZS413728	Screw, binding head 3x6, w/washer		1
6-122	EJ510333	Wire Clip 220-JD481610-0104(Nylon)	2-7-17	1
6-123	EJ205975	Cramp Terminal 1-SD	32-1-7	7
6-124	EJ553948	Wire Bundle Holder B	2-35-3	2
6-125x	MZ219576	Cord Retainer D	M9-123	1
6-126	ZS217877	Pause Lever Set Screw	900-136	1
6-127	MH317373	Brake Lever Prop	MR-102	2
6-128	ZG217394	Belt Change Spring B	MH-125	1
6-129	ZW260054	Washer (SUP)D6.1x10x0.25t		1
6-130	SZ547648	Panel Supporting Plate	MU-6027	2
6-131x	ZS339502	Tapping Screw #2 3x5(round)		4

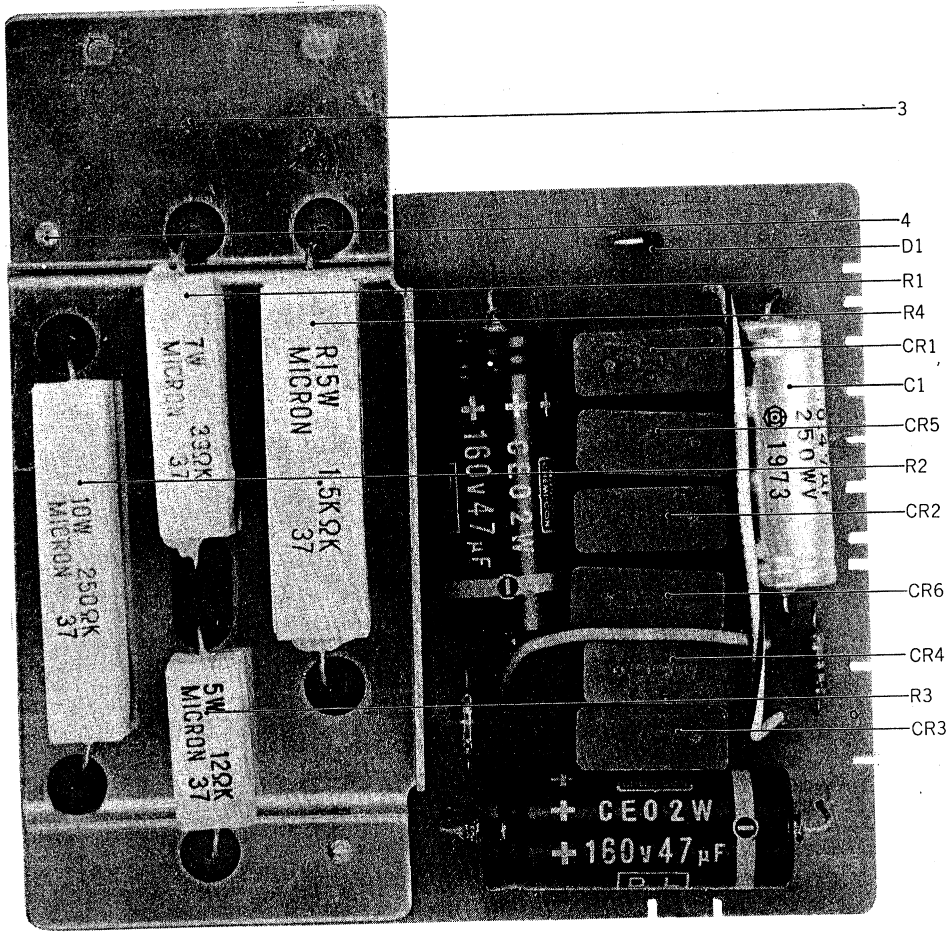
FIG. 7 PHOTO OF SYS. CON. P.C. BOARD (MU-1006)



SYS. CON. P.C. BOARD (MU-1006) BLOCK

Symbol No.	Parts No.	Description	Q'ty
7-1x	BA558371	Sys. Con. P.C. Board Comp. (MU-1006)	1
7-2x	BA570058	Sys. Con. P.C. Board Comp. (MU-1006) (CSA)	1
7-TR1 to 4	ET398711	Transistor 2SC945(Q) (R)	4
7-D1, 2	ED560913	Silicon Diode 1S2473 VE	2
7-D3	ED219464	Germanium Diode 1N34A	1
7-D4	ED536062	Silicon Diode WG-713	1
7-D5, 6	ED514721	Silicon Diode WG-599	2
7-RL1	EP344136	Relay MY4-0-US-AD4 24V	1
7-CR1 to 8	ER450786	Spark Quencher U/L 0.1μ+120Ω 400WV	8
7-3	EZ544320	P.C. Board Holder A	1
7-4	ZS447772	Tapping Screw #2 3x6(BR)	2
7-5	MZ544331	P.C. Board Holder B	1
7-6x	ZS413155	Screw, binding head 3x6	2
7-7	EJ510333	Wire Clip 220-JD481610-0104 (Nylon)	1
		Capacitor, Vertical Type	
7-C1	EC220994	Elect. 10μF 25WV	1
7-C2	EC383501	Mylar 0.001μF(M) 50WV	1
7-C3, 4	EC250918	Mylar 0.01μF(M) 50WV	2
7-C5	EC391498	Mylar 0.022μF(M) 50WV	1
7-C6	EC220612	Elect. 33μF 25WV	1
7-C7	EC391498	Mylar 0.022μF(M) 50WV	1
		Resistor, Stopper Type	
7-R1	ER211667	Carbon RD1/4 100(J)	1
7-R2	ER336442	Carbon RD1/4 10k(J)	1
7-R3	ER212883	Carbon RD1/4 4.7k(J)	1
7-R4	ER212477	Carbon RD1/4 3.3k(J)	1
7-R5	ER211667	Carbon RD1/4 100(J)	1
7-R5	ER564772	Fuse FRN1/4 100k 200MA(CSA)	1
7-R6, 7	ER212883	Carbon RD1/4 4.7k(J)	2
7-R8	ER336442	Carbon RD1/4 10k(J)	1
7-R9	ER357456	Carbon RD1/4 2.2k(J)	1
7-R10	ER211757	Carbon RD1/4 100k(J)	1
7-R11	ER212264	Carbon RD1/4 22k(J)	1
7-R12	ER212883	Carbon RD1/4 4.7k(J)	1
7-R13	ER212264	Carbon RD1/4 22k(J)	1
7-R14	ER357456	Carbon RD1/4 2.2k(J)	1

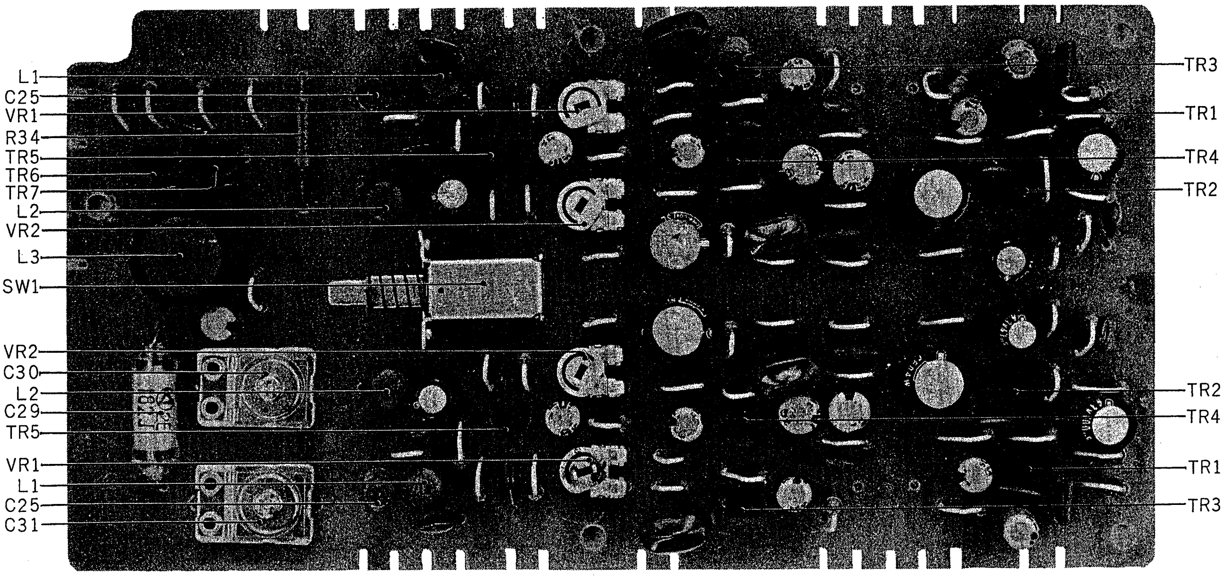
FIG. 8 PHOTO OF CR P.C. BOARD (MU-1007)



CR P.C. BOARD (MU-1007) BLOCK

Symbol No.	Parts No.	Description	Q'ty
8-1x	BA558360	CR P.C. Board Comp. (MU-1007)	1
8-2x	BA574806	CR P.C. Board Comp. (MU-1007) (CSA, EC)	1
8-D1	ED224550	Silicon Diode 10D4	1
8-CR1 to 6	ER450786	Spark Quencher U/L 0.1μ+120Ω 400WV	6
8-CR7	ER570532	Spark Quencher 0.5μ+120Ω 400WV (CSA, EC)	1
8-3	MZ544342	P.C. Board Holder C	1
8-4	ZS447772	Tapping Screw #2 3x6(BR)	2
		Capacitor, Tubular Type	
8-C1	EC350987	MP 0.47μF(M) 250VAC	1
8-C2, 3	EC316113	Elect. 47μF 160WV	2
		Resistor, Wire-wound Type	
8-R1	ER554883	Cement 7W 39Ω(K)	1
8-R2	ER554861	Cement 10W 250Ω(K)	1
8-R3	ER554905	Cement 5W 12Ω(K)	1
8-R4	ER558461	Cement 15W 1.5k(K) (Metal Ox. Film type)	1
8-R5	ER365016	Carbon RD1/4 220k(J) (Insu. type)	1
8-R6	ER324808	Carbon RD1/4 100(J)(Insu. type)	1

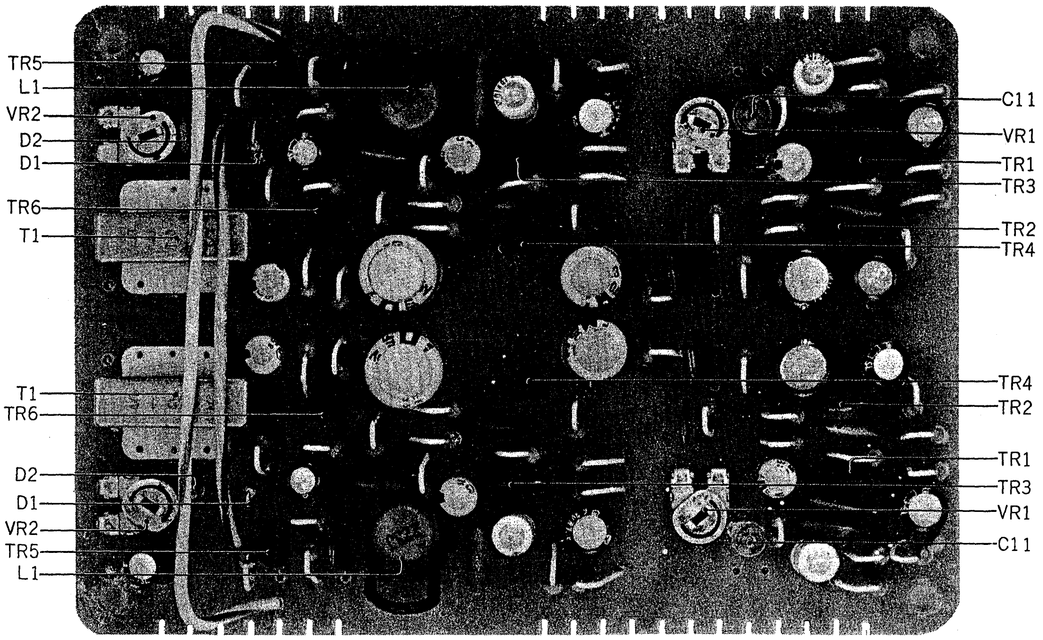
FIG. 9 PHOTO OF REC. AMP. P.C. BOARD (MU-5016)



REC. AMP. P.C. BOARD (MU-5016) BLOCK

Symbol No.	Parts No.	Description	Q'ty
9-1x	BA558404	Rec. Amp. P.C. Board Comp. (MU-5016)	1
9-TR1,2,3,4	ET517263	Transistor 2SC1312(G) (H)	8
9-TR5,6,7	ET368021	Transistor 2SC458(B) (C)	4
9-SW1	ES558191	Slide SW. SPJ-10109	1
9-VR1	EV464207	Semi-fixed/Vol. V8K4-1 5 kB	2
9-VR2	EV520806	Semi-fixed/Vol. V8K4-1 10 kB	2
9-L1	EO458932	Ferri Inductor FL7H 2.2MH(J)	2
9-L2	EO321254	Ferri Inductor FL7H 5.6MH(J)	2
9-L3	EO383365	OSC. Coil 0T-204	1
		Capacitor, Vertical Type	
9-C1	EC290520	VFM 100PF(J) 50WV	2
9-C2	EC320051	Elect. 10μF 16WV	2
9-C3	EC290520	VFM 100PF(J) 50WV	2
9-C4	EC220364	Elect. 100μF 6.3WV	2
9-C5	EC456322	VFM 22PF(K) 50WV	2
9-C6	EC329771	Elect. 47μF 6.3WV	2
9-C7	EC320051	Elect. 10μF 16WV	2
9-C8	EC220678	Elect. 47μF 25WV	2
9-C9	EC394918	VFM 33PF(K) 50WV	2
9-C10	EC487394	VFM 47PF(K) 50WV	2
9-C11	EC320051	Elect. 10μF 16WV	2
9-C12	EC220678	Elect. 47μF 25WV	2
9-C13	EC329771	Elect. 47μF 6.3WV	2
9-C14	EC487394	VFM 47PF(K) 50WV	2
9-C15	EC329771	Elect. 47μF 6.3WV	2
9-C16	EC320051	Elect. 10μF 16WV	2
9-C17	EC290520	VFM 100PF(J) 50WV	2
9-C18, 19	EC333562	Mylar 0.18μF(K) 50WV	2
9-C20	EC320051	Elect. 10μF 16WV	2
9-C21	EC250975	Mylar 0.015μF(J) 50WV	2
9-C22	EC220994	Elect. 10μF 25WV	2
9-C23	EC368335	Mylar 0.022μF(J) 50WV	2
9-C24	EC250918	Mylar 0.01μF(M) 50WV	2
9-C25	EC405898	Styrol 470PF(J) 50WV	2
9-C26, 27	EC250841	Mylar 0.01μF(J) 50WV	2
9-C28	EC450055	Elect. 1μF 25WV	1
9-C29	EC558235	Styrol 1800PF(J) 250WV (Tub. type)	1
9-C30, 31	EC558202	Trimmer TM-80A	2
		Resistor, Stopper Type	
9-R1	ER336442	Carbon RD1/4 10k(J)	2
9-R2	ER362485	Carbon RD1/4 330k(J)	2
9-R3	ER336442	Carbon RD1/4 10k(J)	2
9-R4	ER213300	Carbon RD1/4 680(J)	2
9-R5	ER357570	Carbon RD1/4 150k(J)	2
9-R6	ER346994	Carbon RD1/4 18k(J)	2
9-R7	ER343078	Carbon RD1/4 2.7k(J)	2
9-R8	ER343135	Carbon RD1/4 1.6k(J)	2
9-R9	ER407316	Carbon RD1/4 24k(J)	2
9-R10	ER357456	Carbon RD1/4 2.2k(J)	2
9-R11	ER212883	Carbon RD1/4 4.7k(J)	2
9-R12	ER450011	Carbon RD1/4 120k(J)	2
9-R13	ER349942	Carbon RD1/4 8.2k(J)	2
9-R14	ER347038	Carbon RD1/4 270(J)	2
9-R15	ER357491	Carbon RD1/4 82k(J)	2
9-R16	ER343078	Carbon RD1/4 2.7k(J)	2
9-R17	ER362441	Carbon RD1/4 1.8k(J)	2
9-R18	ER304402	Carbon RD1/4 470(J)	2
9-R19	ER212264	Carbon RD1/4 22k(J)	2
9-R20	ER342933	Carbon RD1/4 27k(J)	2
9-R21	ER357412	Carbon RD1/4 220(J)	2
9-R22	ER342933	Carbon RD1/4 27k(J)	2
9-R23	ER357456	Carbon RD1/4 2.2k(J)	2
9-R24	ER342933	Carbon RD1/4 27k(J)	2
9-R25	ER336442	Carbon RD1/4 10k(J)	2
9-R26	ER211465	Carbon RD1/4 1k(J)	2
9-R27	ER349784	Carbon RD1/4 390(J)	2
9-R28	ER380913	Carbon RD1/4 33(J)	2
9-R29	ER336442	Carbon RD1/4 10k(J)	2
9-R30, 31	ER315944	Carbon RD1/4 3.3(J)	2
9-R32	ER304402	Carbon RD1/4 470(J)	1
9-R33	ER212883	Carbon RD1/4 4.7k(J)	1
9-R34	ER511288	Metal Oxide Film 1W 180(K)	1
9-R35	ER212477	Carbon RD1/4 3.3k(J)	1

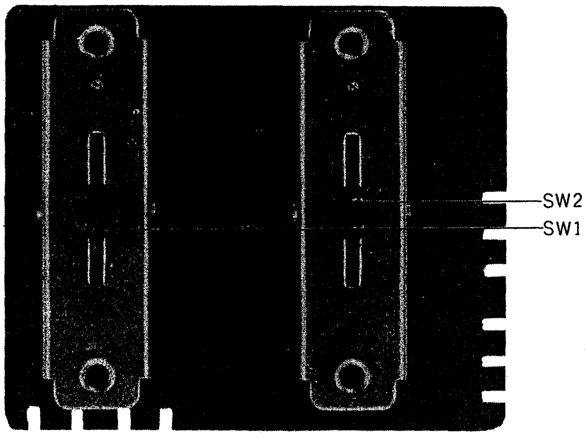
FIG. 10 PHOTO OF P.B. AMP. P.C. BOARD (ND-5037)



P.B. AMP. P.C. BOARD (ND-5037) BLOCK

Symbol No.	Parts No.	Description	Q'ty
10-1x	BA558415	P.B. Amp. P.C. Board Comp. (ND-5037)	1
10-TR1,2,3	ET517263	Transistor 2SC1312(G) (H)	6
10-TR4,5,6	ET379462	Transistor 2SC711(D) (E)	6
10-D1	ED520762	Zener Diode YZ-088A	2
10-D2	ED219464	Germanium Diode 1N34A	2
10-T1	BT247768	Headphone Trans. N19-5921S	2
10-L1	EO244012	Ferri Inductor FL9H 22MH(J)	2
10-VR1	EV464220	Semi-fixed/Vol. V8K4-1 50 kB	2
10-VR2	EV478686	Semi-fixed/Vol. V8K4-1 1 kB	2
		Capacitor, Vertical Type	
10-C1	EC320051	Elect. 10μF 16WV	2
10-C2	EC290520	VFM 100PF(J) 50WV	2
10-C3	EC467133	VFM 68PF(J) 50WV	2
10-C4	EC329771	Elect. 47μF 6.3WV	2
10-C5	EC290520	VFM 100PF(J) 50WV	2
10-C6	EC320051	Elect. 10μF 16WV	2
10-C7	EC320040	Elect. 47μF 16WV	2
10-C8	EC329771	Elect. 47μF 6.3WV	2
10-C9	EC389485	Mylar 0.018μF(J) 50WV	2
10-C10	EC350875	Mylar 0.001μF(J) 50WV	2
10-C11	EC435690	Styrol 560PF(J) 50WV	2
10-C12	EC336126	Elect. 47μF 25WV	2
10-C13	EC320051	Elect. 10μF 16WV	2
10-C14	EC290564	VFM 220PF(K) 50WV	2
10-C15	EC329771	Elect. 47μF 6.3WV	2
10-C16	EC456322	VFM 22PF(K) 50WV	2
10-C17	EC336104	Elect. 100μF 6.3WV	2
10-C18	EC320051	Elect. 10μF 16WV	2
10-C19	EC290520	VFM 100PF(J) 50WV	2
10-C20	EC389474	Mylar 0.0015μF(J) 50WV	2
10-C21	EC450055	Elect. 1μF 25WV	2
10-C22	EC320051	Elect. 10μF 16WV	2
10-C23	EC450055	Elect. 1μF 25WV	2
		Resistor, Stopper Type	
10-R1	ER362485	Carbon RD1/4 330k(J)	2
10-R2	ER346601	Carbon RD1/4 47k(J)	2
10-R3	ER362485	Carbon RD1/4 330k(J)	2
10-R4	ER336442	Carbon RD1/4 10k(J)	2
10-R5	ER212681	Carbon RD1/4 330(J)	2
10-R6	ER212264	Carbon RD1/4 22k(J)	2
10-R7	ER212872	Carbon RD1/4 4.3k(J)	2
10-R8	ER357570	Carbon RD1/4 150k(J)	2
10-R9	ER212477	Carbon RD1/4 3.3k(J)	2
10-R10	ER211757	Carbon RD1/4 100k(J)	2
10-R11	ER213030	Carbon RD1/4 5.6k(J)	2
10-R12	ER343078	Carbon RD1/4 2.7k(J)	2
10-R13	ER346994	Carbon RD1/4 18k(J)	2
10-R14	ER212883	Carbon RD1/4 4.7k(J)	2
10-R15	ER346601	Carbon RD1/4 47k(J)	2
10-R16	ER211465	Carbon RD1/4 1k(J)	2
10-R17	ER212681	Carbon RD1/4 330(J)	2
10-R18, 19	ER357456	Carbon RD1/4 2.2k(J)	4
10-R20	ER212681	Carbon RD1/4 330(J)	2
10-R21	ER357491	Carbon RD1/4 82k(J)	2
10-R22	ER357412	Carbon RD1/4 220(J)	2
10-R23	ER212264	Carbon RD1/4 22k(J)	2
10-R24, 25	ER211465	Carbon RD1/4 1k(J)	4
10-R26	ER429996	Carbon RD1/4 470k(J)	2
10-R27	ER212264	Carbon RD1/4 22k(J)	2
10-R28	ER211757	Carbon RD1/4 100k(J)	2
10-R29	ER350100	Carbon RD1/4 68k(J)	2
10-R30	ER212883	Carbon RD1/4 4.7k(J)	2

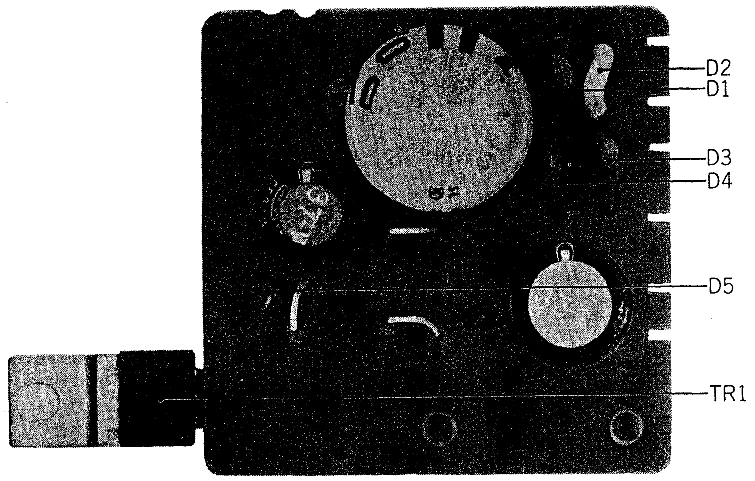
FIG. 11 PHOTO OF EQ. P.C. BOARD (MU-5018)



EQ. P.C. BOARD (MU-5018) BLOCK

Symbol No.	Parts No.	Description	Q'ty
11-1x	BA558426	EQ. P.C. Board Comp. (MU-5018)	1
11-SW1, 2	ES457514	Lever SW. SQ11 (PVB) 12-4-2 (Black) (M)	2
		Capacitor, Vertical Type	
11-C1	EC329883	Mylar 0.0056μF(J) 50WV	2
11-C2	EC311793	Mylar 0.012μF(J) 50WV	2
11-C3	EC329883	Mylar 0.0056μF(J) 50WV	2

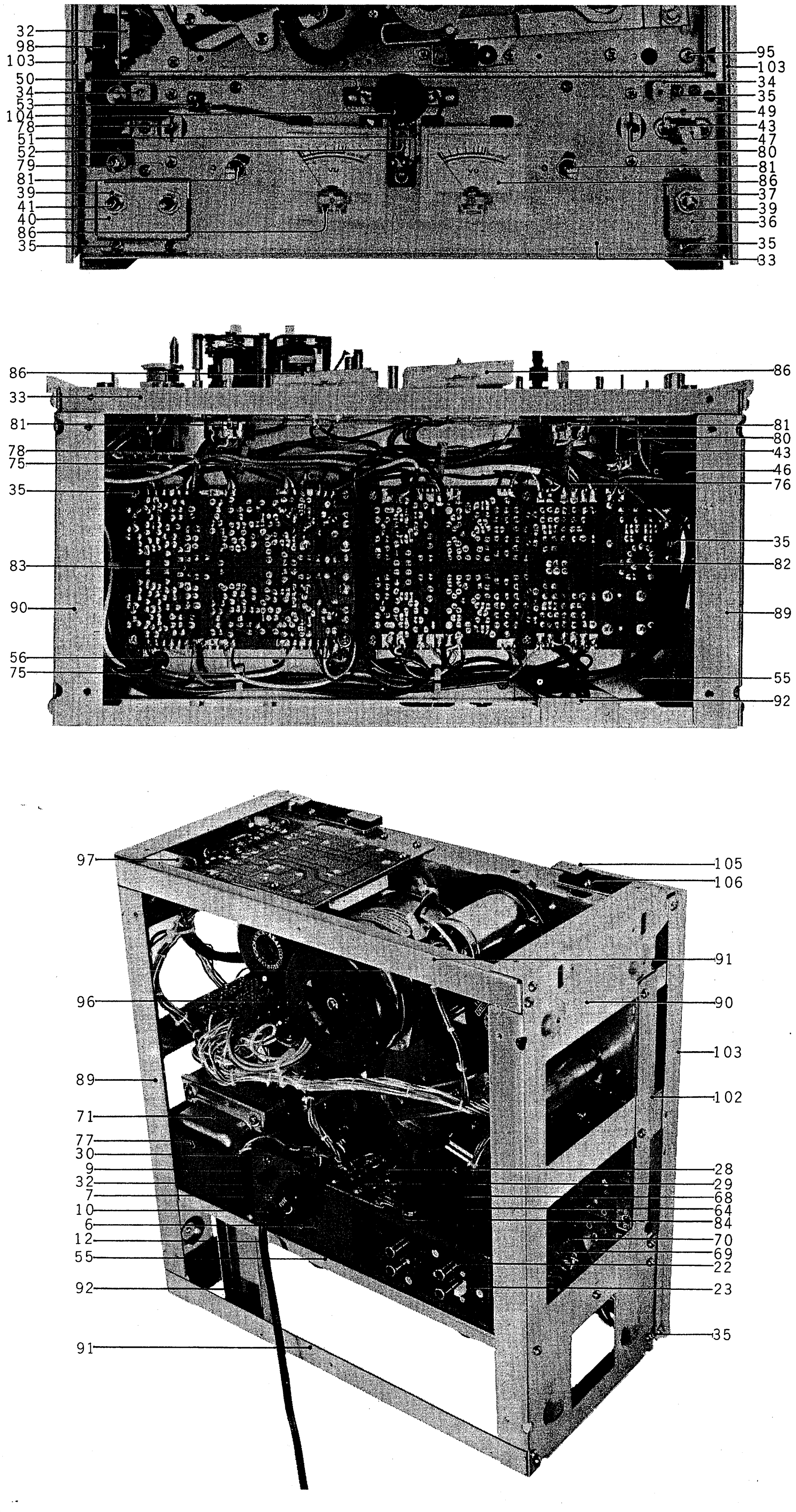
FIG. 12 PHOTO OF POWER SUPPLY P.C. BOARD (MU-5017)



POWER SUPPLY P.C. BOARD (MU-5017) BLOCK

Symbol No.	Parts No.	Description	Q'ty
12-1x	BA558450	Power Supply P.C. Board Comp. (MU-5017)	1
12-TR1	ET495371	Transistor 2SC1098(L)	1
12-D1,2,3,4	ED494583	Silicon Diode 10D05	4
12-D5	ED511918	Zener Diode WZ-240	1
		Capacitor, Vertical Type	
12-C1	EC557651	Elect. 470μF 50WV	1
12-C2	EC220151	Elect. 100μF 25WV	1
12-C3	EC336115	Elect. 220μF 25WV	1
		Resistor, Stopper Type	
12-R1	ER306843	Carbon RD1/4 1.2k(J)	1
12-R2	ER211667	Carbon RD1/4 100(J)	1
12-R3	ER430018	Carbon RD1/4 1(J)	1

FIG. 13 PHOTO OF AMPLIFIER ASSEMBLY BLOCK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AMPLIFIER ASSEMBLY BLOCK

JACK PLATE BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
13-1x	BZ558437	Jack Plate Block Comp.	MU	1
13-2x	BZ558448	Jack Plate Block Comp. (3 core)	MU	1
13-3x	BZ570082	Jack Plate Block Comp. (EC)	MU	1
13-4x	BZ570093	Jack Plate Block Comp. (CSA)	MU	1
13-5x	BZ570330	Jack Plate Block Comp. (WG)	MU	1
13-6	EZ544511	Jack Plate Bracket	MU-5011	1
13-7	EJ233370	Socket (Volt. Selector) S-18010	40-2-3	1
13-8x	EF558066	Fuse 2A 125V	39-1-47	1
13-9	ZS372025	ISO Screw, truss head 3x6 (black)		2
13-10	EZ382263	Strain Relief SR-4K-4	2-7-12	1
13-11x	EZ246936	Strain Relief SR-6W-1 (WG, 3 core)	2-7-8	1
13-12	EW540112	AC Cord (CUL) 2.5M	26-3-19	1
13-13x	EW315448	Australia Cord (3 core)	26-3-11	1
13-14x	EW516600	Power Supply Cord, CEE VM-0065 (EC)	26-3-28	1
13-15x	EW486797	Power Supply Cord, VDE (WG)	26-3-26	1
13-16x	EW524845	AC Cord (J) 2.5M (J)	26-3-31	1
13-17x	EJ569441	Fuse Holder D (EC)	A0392	1
13-18x	EF375660	Fuse (T type) 1AT (EC)		1
13-19x	EF375715	Fuse (T type) 450MAT (EC)		2
13-20x	EJ569452	Fuse Terminal Plate GX-210D (CSA)	A0383	1
13-21x	EF565975	Fuse 800MA 125V	39-1-44	4
13-22	EJ547198	Jack Plate Comp. MU	MU-5028	1
13-23	ES379045	Slide SW., 6P (small) SJ-0282	25-3-36	1
13-24x	ER443790	Carbon/R. RD1/4 470k(J) (Insu. type)	35-9-5	2
13-25x	ER345712	Carbon/R. RD1/4 22k(J) (Insu. type)	35-9-5	4
13-26x	ER440921	Carbon/R. RD1/4 27k(J) (Insu. type)	35-9-5	2
13-27x	EJ255093	Lug Plate VB1L1	33-4-1	1
13-28	BA558450	Power Supply P.C. Board Comp. (MU-5017)		1
13-29	ZS447772	Tapping Screw #2 3x6(BR)		2
13-30	ZS462532	ISO Screw, truss head 3x4		2
13-31x	ZW273778	Earth Lug M3		1
13-32	ES375478	Slide SW. ESD-279DU(black)	25-3-23	2

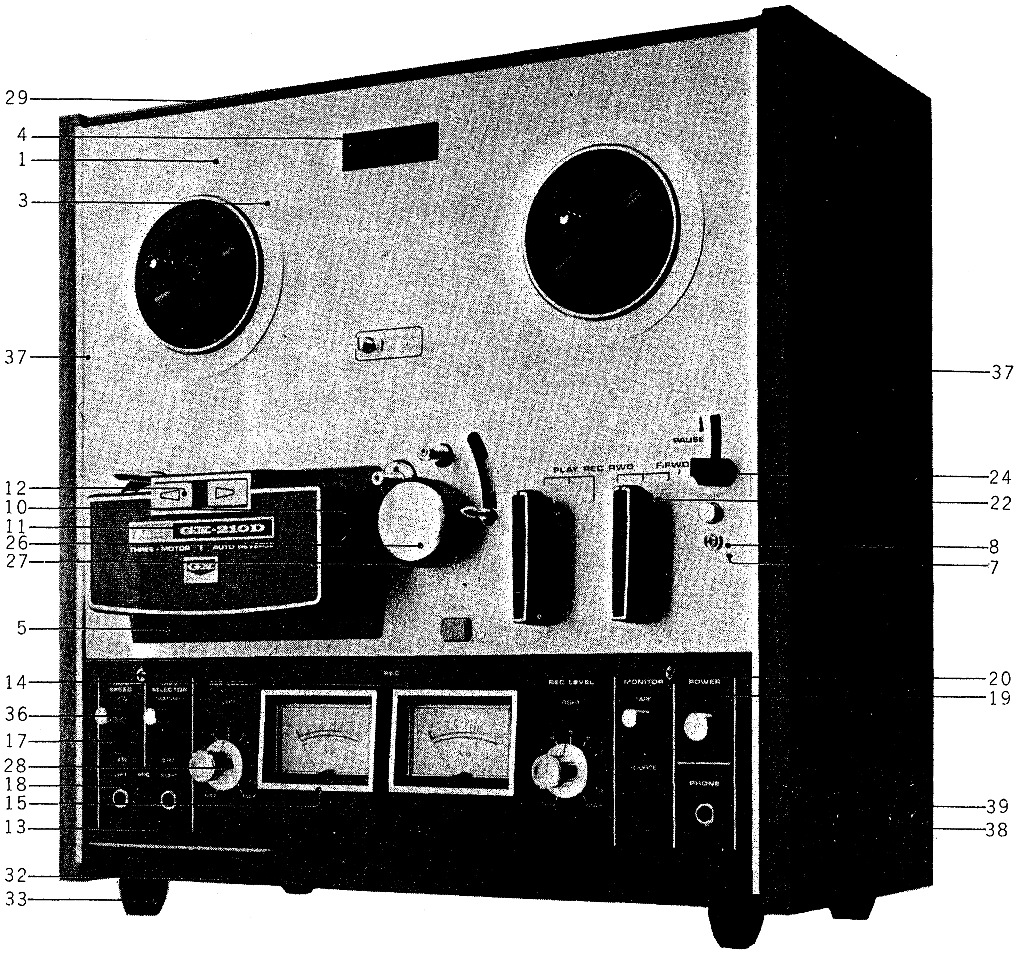
AMP. ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
13-33	EZ544500	Amp. Plate	MU-5003	1
13-34	EZ544408	Panel Supporting Plate	MU-5006	2
13-35	ZS447772	Tapping Screw #2 3x6(BR)		56
13-36	EZ544410	Jack Mt. Plate A	MU-5007	1
13-37	EJ447603	Mic. Jack 3PMJ1	31-2-24	1
13-38x	ZW272722	Toothed Lock Washer M9 D9.3x13x0.5t		3
13-39	ZW554624	Nut, E Jack	7-1-56	3
13-40	EZ544421	Jack Mt. Plate B	MU-5008	1
13-41	EJ391094	Mic. Jack 2PMJ1P	31-2-27	2
13-42x	ER364948	Carbon/R. RD1/4 3.3k(J) (Insu. type)	35-9-5	2
13-43	ES246025	Push SW. SDF1PBP1 (UEH-12BP U/L)	25-5-11	1
13-44x	ES561767	Push SW. NP-285-2 (EC)	25-5-111	1
13-45x	ES499972	Push SW. JS-09 (WG)	25-5-67	1
13-46	ER450797	Spark Quencher U/L 0.033μ+120Ω 400WV	41-1-34	1
13-47	SK487697	Knob B	CG-2007	1
13-48x	SK569632	Knob F (EC)	CG-2007	1
13-49	ZS379405	ISO Screw, binding head 3x6		6
13-50	EA449414	Lamp P.C. Board	BS-5005	1
13-51	EA476256	Lamp P.C. Board	MR-5004	1
13-52	EL295312	Lamp (No. 2) 8V 0.2A	28-2-8	2
13-53	ES563242	Leaf SW. BSW-1E	25-10-18	1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
13-54x	EZ449471	VU Mat	BS-5010	2
13-55	EZ544680	Amp. Chassis	MU-5001	1
13-56	EZ544375	P.C. Board Bracket	MU-5002	9
13-57x	ML544432	REC. Lever (Lower)	MU-5010	1
13-58x	MH314280	REC. Lever Pin	MR-528	1
13-59x	ZW273892	Toothed Lock Washer M4		1
13-60x	ZW416698	Nut M4		1
13-61x	ZS314717	Graduated Screw, MR	MR-254	2
13-62x	ZW273802	Toothed Lock Washer M3		3
13-63x	ZW273756	Nut M3		3
13-64	ML314313	REC. Lever A (Upper)	MR-516	1
13-65x	ZS207314	Amp. Lever Set Screw	3A-737	2
13-66x	ZG314324	REC. Lever Spring A, MR	MR-527	1
13-67x	ZW273778	Earth Lug M3		1
13-68	ZG227441	Spring C	900-117	1
13-69	EJ292961	Multi-jack 10P 500-010-005	31-4-4	1
13-70	ZW558145	Tapping Screw #2 2.6x10		2
13-71	BT558167	Power Trans. MUT-1	38-4-237	1
13-72x	BT565931	Power Trans. MUT-2 (CSA)	38-4-265	1
13-73x	BT565920	Power Trans. MUT-3 (EC)	38-4-266	1
13-74x	ZS468112	Tapping Screw #2 4x8(truss)		4
13-75	EJ514607	Wire Clip 220-JD485210-01 (Nylon)	2-7-18	4
13-76	EJ510333	Wire Clip 220-JD481610-0104 (Nylon)	2-7-17	2
13-77	EZ461125	Trans. Shield Plate C	MC-5017	1
13-78	BA558426	EQ. P.C. Board Comp. (MU-5018)		1
13-79	MH544397	Slide Prop	MU-5005	2
13-80	ES443013	Lever SW. SQ11 12-4-2 (black) (M)	25-12-3	1
13-81	EV476223	Volume V24N 50 kA	36-2-26	2
13-82	BA558404	REC. Amp. P.C. Board Comp. (MU-5016)		1
13-83	BA558415	P.B. Amp. P.C. Board Comp. (ND-5037)		1
13-84	ET495371	Transistor 2SC1098(L)	45-1-122	1
13-85x	ZS323728	Screw, binding head 3x5		1
13-86	EM558180	VU Meter KL-243S-5	46-1-74	2
13-87x	EJ300508	Mate-N-Lock Plug Housing 9P 1-480274-O	52-1-7	1
13-88x	EJ373634	Socket Contact 61115-1	52-1-1	9
13-89	EZ544667	Side Plate R	MU-5013	1
13-90	EZ544678	Side Plate L	MU-5013	1
13-91	EZ544522	Reinforcement Angle	MU-5012	2
13-92	EZ547661	Amp. Reinforcement Plate	MU-5030	1
13-93x	ZW273767	Earth Lug D3x20L (EC)		1
13-94x	EJ205975	Cramp Terminal 1-SD (EC, CSA)	32-1-7	1

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
13-95	ZS563297	Screw, binding head 4x8, w/spring washer		4
13-96	SZ529108	Main Motor Fan	ND-7010	1
13-97	SZ544476	P.C. Board Holder D	MU-6016	1
13-98	SZ544386	Coupling Plate	MU-5004	1
13-99x	ZW558088	Washer D5.2x10.3x0.3t		2
13-100x	ZW270101	'E' Ring 3M	6-1-9	2
13-101x	SZ544465	Reinforcement Plate L	MU-6015	1
13-102	SZ544691	Reinforcement Plate R	MU-6015	1
13-103	SE544566	Sash	MU-6011	2
13-104	UM494267	Lamp Cover	CG-2206	1
13-105	SZ547648	Panel Reinforcement Plate	MU-6027	2
13-106	ZS339502	Tapping Screw #2 3x5 (round)		4

FIG. 14 PHOTO OF FINAL ASSEMBLY BLOCK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GX-210D
THREE-MOTOR AUTO REVERSE
SPEED
SELECTOR
REC LEVEL
MONITOR
TAPE
SOURCE
POWER
PHONE

FINAL ASSEMBLY BLOCK

Ref. No.	Parts No.	Description	Schematic No.	Q'ty
14-1	SP544645	Mech. Panel	MU-6001	1
14-2x	SP544656	Mech. Panel B (EC, CSA)	MU-6001	1
14-3	SZ476076	Spin Ring	MR-6003	2
14-4	SE330895	Counter Escutcheon, MR	MR-646	1
14-5	SC544533	Head Cover Base	MU-6003	1
14-6x	ZS413155	Screw, binding head 3x6		6
14-7	ZW408418	Panel Washer	KD-6029	2
14-8	ZS411660	Screw, oval countersunk head 3x6		2
14-9x	ZS447772	Tapping Screw #2 3x6(BR)		4
14-10	SC544544	Head Cover	MU-6004	1
14-11	SM544443	Head Cover Name Plate	MU-6005	1
14-12	SB544454	Direction Button	MU-6006	2
14-13	SP544555	Amp. Panel	MU-6007	1
14-14	SZ457975	Lamp Lens B	55-5012	1
14-15	SE544601	VU Meter Escutcheon	MU-6017	2
14-16x	ZS425788	Screw, round head 3x4		4
14-17	SE544487	SW. Cover	MU-6018	3
14-18	ZW526577	Collar B, Jack	MC-5006	3
14-19	SZ483737	Panel Washer B (black)	KD-6029	2
14-20	ZS425125	Screw, oval countersunk head 3x6(black)		2
14-21x	ZW432347	Washer (Luminar) D6.2x13x0.125t		2
14-22	SK476684	Mech. Knob	LE-6018	2
14-23x	ZS253405	Mech. Knob Screw	7-1-46	2
14-24	SK314100	Pause Knob B	MR-612	1
14-25x	ZS433001	Set Screw, hexagon socket 3x5(cup)		1
14-26	SK425158	Pinch Roller Cap	MS-6020	1
14-27	MP271170	Pinch Roller, LC D=38	LC-321	1
14-28	SK476111	Amp. Knob Comp.	MR-6010	2
14-29	SZ544577	Upper Plate	MU-6012	1
14-30x	ZW461610	Decorative Washer For 3M/M		4
14-31x	ZS482815	Screw, oval countersunk head 3x8		4
14-32	SZ544588	Lower Plate	MU-6012	1
14-33	SA377190	Rubber Foot, LM	LM-404	8
14-34x	ZW419646	Washer (SPC)D4.5x9.8x0.5t		8
14-35x	ZS487776	Screw, truss head 4x18		8
14-36	SK544702	Lever SW. Knob A	MU-6019	3
14-37	BC544590	Side Plate	MU-6013	2
14-38	ZW548010	Spot Facing Washer	MU-6028	8
14-39	ZS558090	Screw, binding head 4x14		8
14-40x	SP544612	Back Plate	MU-6009	1
14-41x	SP544634	Back Plate C (EC)	MU-6009	1
14-42x	SP544623	Back Plate B (CSA)	MU-6009	1
14-43x	ZS498273	Tapping Screw #2 3x8, w/washer		2
14-44x	EF563681	Fuse 1A 250V	39-1-50	1
14-45x	EF558066	Fuse 2A 125V	39-1-47	1
14-46x	EF304626	Fuse ST-4 1A	39-1-28	1

INDEX

Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.	Parts No.	Ref. No. & Symbol No.
BA558360	8-1x	EC336126	10-C12	ER212264	7-R13	ER558461	8-R4	HZ541170	1-7
BA558371	7-1x	EC350875	10-C10	ER212264	9-R19	ER564772	7-R5	HZ541181	1-67
BA558404	9-1x	EC350987	8-C1	ER212264	10-R6	ER570532	8-CR7	HZ542092	1-85
BA558404	13-82	EC368335	9-C23	ER212264	10-R23	ES246025	13-43	HZ544206	1-42
BA558415	10-1x	EC383501	7-C2	ER212264	10-R27	ES316923	5-3	HZ544217	1-39
BA558415	13-83	EC389474	10-C20	ER212477	7-R4	ES316934	5-6	HZ544228	1-37
BA558426	11-1x	EC389485	10-C9	ER212477	9-R35	ES317744	1-29	HZ544230	1-36
BA558426	13-78	EC391498	7-C5	ER212477	10-R9	ES375478	6-117	HZ544252	1-11
BA558450	12-1x	EC391498	7-C7	ER212681	10-R5	ES375478	13-32	HZ544263	1-19
BA558450	13-28	EC394918	9-C9	ER212681	10-R17	ES379045	13-23	HZ544274	1-20
BA570058	7-2x	EC405898	9-C25	ER212681	10-R20	ES443013	13-80	HZ544498	1-2
BA574806	8-2x	EC435690	10-C11	ER212872	10-R7	ES457514	11-SW1, 2	HZ547751	1-77
BC544590	14-37	EC442056	6-54	ER212883	7-R3	ES479485	5-18	HZ583176	1-33x
BF476550	4-1x	EC450055	9-C28	ER212883	7-R6, 7	ES479485	6-118x	MB230286	2-33
BH558358	1-1x	EC450055	10-C21	ER212883	7-R12	ES499972	13-45x	MB230286	6-110
BL204480	5-29x	EC450055	10-C23	ER212883	9-R11	ES546794	6-98	MB541012	4-20
BL316484	6-112	EC456322	9-C5	ER212883	9-R33	ES558191	9-SW1	MC316473	6-109
BL555344	3-11x	EC456322	10-C16	ER212883	10-R14	ES561767	13-44x	MH244710	4-8
BM314741	2-1	EC467133	10-C3	ER212883	10-R30	ES562465	6-100	MH247533	6-21
BM563196	3-1	EC487394	9-C10	ER213030	10-R11	ES563242	13-53	MH248343	4-23
BR317384	2-3x	EC487394	9-C14	ER213300	9-R4	ET368021	9-TR5,6,7	MH254160	3-5
BR317395	2-2x	EC520626	6-41	ER304402	9-R18	ET379462	10-TR4,5,6	MH257477	1-17
BS558336	5-1x	EC536938	6-55x	ER304402	9-R32	ET398711	7-TR1 to 4	MH273036	4-13
BT247768	10-T1	EC557651	12-C1	ER306843	12-R1	ET495371	12-TR1	MH273047	4-16
BT558167	13-71	EC558202	9-C30, 31	ER315944	9-R30, 31	ET495371	13-84	MH273295	6-27
BT565920	13-73x	EC558235	9-C29	ER324808	8-R6	ET517263	9-TR1,2,3,4	MH314280	13-58x
BT565931	13-72x	ED219464	7-D3	ER336442	7-R2	ET517263	10-TR1,2,3	MH316304	3-7
BZ248027	6-13x	ED219464	10-D2	ER336442	7-R8	EV464207	9-VR1	MH317046	5-21
BZ558347	6-1x	ED224548	1-8x	ER336442	9-R1	EV464220	10-VR1	MH317373	2-20
BZ558437	13-1x	ED224550	8-D1	ER336442	9-R3	EV476223	13-81	MH317373	6-127
BZ558448	13-2x	ED494583	12-D1,2,3,4	ER336442	9-R25	EV478686	10-VR2	MH544195	1-12
BZ570082	13-3x	ED511918	12-D5	ER336442	9-R29	EV520806	9-VR2	MH544397	13-79
BZ570093	13-4x	ED514721	7-D5, 6	ER336442	10-R4	EW315448	13-13x	MI296245	4-2
BZ570330	13-5x	ED520762	10-D1	ER342933	9-R20	EW486797	13-15x	ML226080	5-30
EA382713	1-28x	ED536062	7-D4	ER342933	9-R22	EW516600	13-14x	ML226124	5-33
EA449414	13-50	ED560913	7-D1, 2	ER342933	9-R24	EW524845	13-16x	ML226258	6-50
EA463206	1-59x	EF304626	14-46x	ER343078	9-R7	EW540112	13-12	ML228868	6-75
EA476256	13-51	EF375660	13-18x	ER343078	9-R16	EZ246936	13-11x	ML314313	13-64
EC220151	12-C2	EF375715	13-19x	ER343078	10-R12	EZ382263	13-10	ML314684	6-45
EC220364	9-C4	EF558066	13-8x	ER343135	9-R8	EZ449471	13-54x	ML314763	6-60
EC220612	7-C6	EF558066	14-45x	ER345712	13-25x	EZ461125	13-77	ML314842	6-65
EC220678	9-C8	EF563681	14-44x	ER346601	10-R2	EZ544320	7-3	ML314864	6-67
EC220678	9-C12	EF565975	13-21x	ER346601	10-R15	EZ544375	13-56	ML314932	6-77
EC220994	7-C1	EJ205975	6-123	ER346994	9-R6	EZ544408	13-34	ML314954	6-85
EC220994	9-C22	EJ205975	13-94x	ER346994	10-R13	EZ544410	13-36	ML314976	2-22
EC250841	9-C26, 27	EJ233370	13-7	ER347038	9-R14	EZ544421	13-40	ML314976	6-87
EC250918	7-C3, 4	EJ255093	13-27x	ER349784	9-R27	EZ544500	13-33	ML316394	6-102
EC250918	9-C24	EJ292961	13-69	ER349942	9-R13	EZ544511	13-6	ML316427	6-104
EC250975	9-C21	EJ300508	13-87x	ER350100	10-R29	EZ544522	13-91	ML334506	6-64
EC290520	9-C1	EJ373623	6-116x	ER357412	9-R21	EZ544667	13-89	ML396810	2-23x
EC290520	9-C3	EJ373634	13-88x	ER357412	10-R22	EZ544678	13-90	ML396810	6-88x
EC290520	9-C17	EJ391094	13-41	ER357456	7-R9	EZ544680	13-55	ML540990	3-12
EC290520	10-C2	EJ447603	13-37	ER357456	7-R14	EZ547661	13-92	ML541001	3-13
EC290520	10-C5	EJ450573	6-115	ER357456	9-R10	HP536501	1-54	ML544285	1-83
EC290520	10-C19	EJ510333	6-122	ER357456	9-R23	HL541157	1-91	ML544307	6-120
EC290564	10-C14	EJ510333	7-7	ER357456	10-R18, 19	HL541168	1-89	ML544353	6-86
EC311793	11-C2	EJ510333	13-76	ER357491	9-R15	HL542687	1-90	ML544432	13-57x
EC316113	8-C2, 3	EJ514607	13-75	ER357491	10-R21	HL544241	1-15	MP271170	6-114x
EC320040	10-C7	EJ547198	13-22	ER357570	9-R5	HR556582	1-34	MP271170	14-27
EC320051	9-C2	EJ553948	6-124	ER357570	10-R8	HZ298012	1-47	MR217203	5-31
EC320051	9-C7	EJ569441	13-17x	ER362441	9-R17	HZ315077	6-95	MR269730	5-12
EC320051	9-C11	EJ569452	13-20x	ER362485	9-R2	HZ315090	6-96	MR269763	6-81
EC320051	9-C16	EL295312	13-52	ER362485	10-R1	HZ317092	1-82	MR314785	6-61
EC320051	9-C20	EM558180	13-86	ER362485	10-R3	HZ317597	1-3	MR317507	2-16
EC320051	10-C1	EO244012	10-L1	ER364948	13-42x	HZ317632	1-23	MR540876	3-3
EC320051	10-C6	EO321254	9-L2	ER365016	8-R5	HZ317632	1-68	MS243404	6-78
EC320051	10-C13	EO383365	9-L3	ER380913	9-R28	HZ317687	1-16	MS250536	6-31
EC320051	10-C18	EO458932	9-L1	ER407316	9-R9	HZ317733	1-27	MS260515	6-29
EC320051	10-C22	EP344136	7-RL1	ER429996	10-R26	HZ318036	1-70	MS316721	6-4
EC329771	9-C6	EP558123	1-9	ER430018	12-R3	HZ318047	1-69	MS316776	6-9
EC329771	9-C13	ER211465	9-R26	ER440921	13-26x	HZ402390	5-2	MS317362	6-24
EC329771	9-C15	ER211465	10-R16	ER443790	13-24x	HZ411017	1-55	MS318093	1-78x
EC329771	10-C4	ER211465	10-R24, 25	ER450011	9-R12	HZ455962	1-22	MS342000	2-6
EC329771	10-C8	ER211667	7-R1	ER450786	7-CR1 to 8	HZ455973	1-24	MS476572	4-3
EC329771	10-C15	ER211667	7-R5	ER450786	8-CR1 to 6	HZ467010	1-73	MS582906	6-82
EC329883	11-C1	ER211667	12-R2	ER450797	13-46	HZ531551	1-46	MT255420	2-5
EC329883	11-C3	ER211757	7-R10	ER511288	9-R34	HZ541102	1-61	MT297663	2-8
EC333562	9-C18, 19	ER211757	10-R10	ER554861	8-R2	HZ541113	1-58	MT314987	2-24
EC336104	10-C17	ER211757	10-R28	ER554883	8-R1	HZ541124	1-56	MT314987	6-89
EC336115	12-C3	ER212264	7-R11	ER554905	8-R3	HZ541135	1-49	MT317441	2-4

INDEX

Parts No.	Ref. No. & Symbol No.
MT317452	2-11
MT317463	2-10
MT325473	2-12x
MT436860	2-14
MV248117	1-80
MV269965	4-21
MV270066	5-15
MZ217697	6-33
MZ218125	6-73
MZ219576	6-125x
MZ227340	6-35
MZ244113	4-9x
MZ248005	6-15
MZ248016	6-14
MZ253113	4-10
MZ254182	3-6
MZ256814	5-35x
MZ256814	6-34x
MZ296256	4-6
MZ314605	6-37
MZ314897	4-11
MZ314998	2-25
MZ314998	6-90
MZ315000	2-27
MZ315000	6-92
MZ316293	3-4
MZ316451	6-105
MZ316708	6-2
MZ316710	6-3
MZ316822	1-84
MZ316945	5-7
MZ316956	5-9
MZ317024	5-23
MZ317068	5-27
MZ317340	6-20
MZ317406	2-32
MZ317406	6-111
MZ405483	5-16
MZ439525	4-25
MZ446635	4-7
MZ452496	6-40x
MZ544331	6-43
MZ544331	7-5
MZ544342	8-3
MZ544364	5-17
MZ549426	6-71
SA377190	14-33
SB425777	6-51
SB544454	14-12
SC544533	14-5
SC544544	14-10
SE330895	14-4
SE544487	14-17
SE544566	13-103
SE544601	14-15
SK314100	14-24
SK425158	14-26
SK476111	14-28
SK476684	14-22
SK487697	13-47
SK543857	6-10
SK544702	14-36
SK569632	13-48x
SM544443	14-11
SP544555	14-13
SP544612	14-40x
SP544623	14-42x
SP544634	14-41x
SP544645	14-1
SP544656	14-2x
SZ457975	14-14
SZ476076	14-3
SZ483737	14-19
SZ529108	3-20
SZ529108	13-96
SZ544386	13-98
SZ544465	13-101x
SZ544476	13-97
SZ544577	14-29
SZ544588	14-32
SZ544691	13-102
SZ547648	6-130
SZ547648	13-105
UM494267	13-104
ZG217337	3-14
ZG217394	3-16x
ZG217394	6-128
ZG225516	5-22
ZG226697	6-74
ZG227441	13-68
ZG227564	5-28
ZG255633	2-7
ZG260706	6-113
ZG301061	6-106
ZG314324	13-66x
ZG314706	6-46
ZG314818	6-63
ZG315011	2-29
ZG315011	6-94
ZG316732	6-5
ZG316765	6-12
ZG317114	1-74
ZG317496	2-15
ZG317766	1-32
ZG317777	1-66
ZG317777	1-93
ZG317902	1-50
ZG317968	1-62
ZG437253	6-19
ZG455692	6-83
ZG466312	1-63
ZG540584	1-41
ZS200384	1-14
ZS202116	6-72
ZS203016	3-19
ZS207314	6-69x
ZS207314	6-108
ZS207314	13-65x
ZS217877	6-126
ZS253405	14-23x
ZS272395	3-9
ZS314717	6-47
ZS314717	13-61x
ZS323728	1-6
ZS323728	2-31x
ZS323728	5-26x
ZS323728	6-36
ZS323728	13-85x
ZS339502	6-131x
ZS339502	13-106
ZS344463	6-97x
ZS365973	2-17
ZS371856	5-19
ZS372025	13-9
ZS372183	1-31
ZS373577	4-5x
ZS379405	13-49
ZS384131	1-65
ZS396044	1-44
ZS411660	14-8
ZS413155	6-44
ZS413155	7-6x
ZS413155	14-6x
ZS413201	4-14
ZS413201	5-14
ZS413201	6-22x
ZS413212	6-39
ZS413223	6-42
ZS413728	1-13
ZS413728	5-8x
ZS413728	6-121
ZS413741	1-43
ZS413785	1-40
ZS413785	2-19
ZS414033	1-4
ZS414044	6-23x
ZS417137	1-38
ZS417137	1-92
ZS417137	2-26x
ZS417137	6-91x
ZS417148	6-101
ZS417150	3-15
ZS421806	6-28x
ZS424056	2-18
ZS424056	3-8
ZS424056	4-22x
ZS424056	5-24
ZS425114	1-64
ZS425125	14-20
ZS425788	6-53
ZS425788	14-16x
ZS425981	2-28x
ZS425981	6-38
ZS425981	6-93
ZS427026	3-10
ZS427037	3-2
ZS427048	6-99x
ZS433001	14-25x
ZS437545	5-34
ZS439514	4-26x
ZS444273	6-119x
ZS447772	7-4
ZS447772	8-4
ZS447772	13-29
ZS447772	13-35
ZS447772	14-9x
ZS460440	1-57x
ZS461395	1-35x
ZS462532	13-30
ZS464692	1-87
ZS468112	13-74x
ZS482815	14-31x
ZS487776	14-35x
ZS498273	14-43x
ZS554916	1-25
ZS554938	1-48
ZS554962	1-72
ZS555737	1-10
ZS558090	14-39
ZS558101	1-95x
ZS558134	1-26
ZS558257	1-60
ZS559045	5-20x
ZS559056	1-21
ZS563297	13-95
ZW231805	1-79
ZW259705	6-68x
ZW259885	1-75
ZW259885	6-70x
ZW259942	5-10x
ZW259975	6-79x
ZW260010	6-107x
ZW260054	3-17x
ZW260054	6-129
ZW260087	6-76
ZW260144	6-17x
ZW270088	1-18
ZW270088	2-9
ZW270088	6-103x
ZW270101	13-100x
ZW270123	1-76
ZW270134	3-21
ZW272722	13-38x
ZW273688	1-88
ZW273688	6-32x
ZW273756	4-27x
ZW273756	5-5x
ZW273756	6-49x
ZW273756	13-63x
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ZW273778	1-5
ZW273778	2-13x
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ZW273914	4-15
ZW274026	6-25x
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ZW290283	5-32
ZW290283	6-7
ZW290283	6-18x
ZW290283	6-62
ZW314728	6-52x
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ZW316800	1-86
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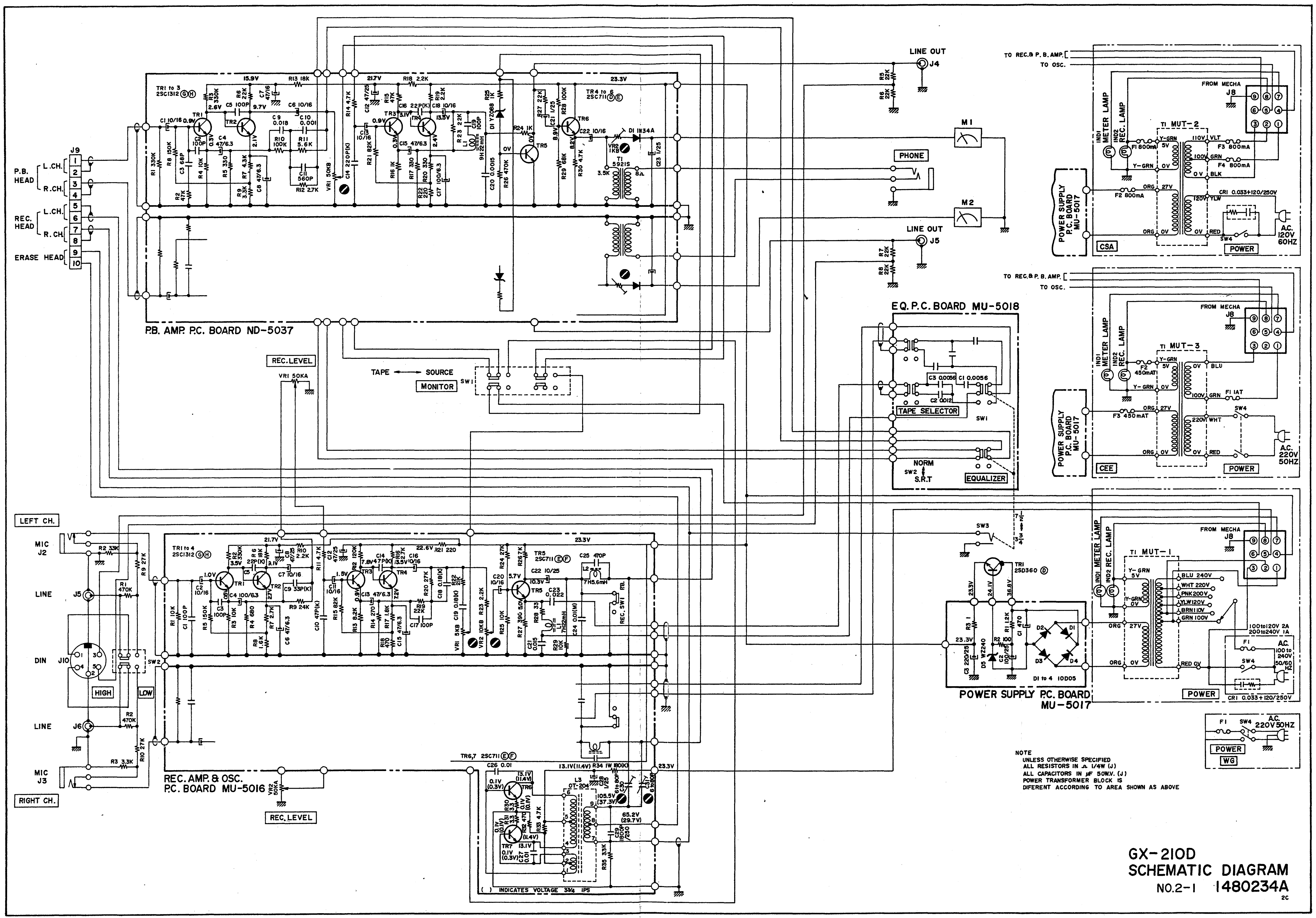
ZW317913	1-51
ZW322525	6-6x
ZW326463	1-81x
ZW330412	6-56x
ZW330423	6-57x
ZW330434	6-58x
ZW330445	6-59x
ZW376402	5-11x
ZW392681	4-12
ZW393232	4-18
ZW408418	14-7
ZW413267	6-30x
ZW413278	6-26x
ZW413280	4-17
ZW413998	4-19
ZW416698	2-21x
ZW416698	4-24x
ZW416698	5-25
ZW416698	6-80
ZW416698	13-60x
ZW419646	6-11
ZW419646	14-34x
ZW419826	6-66
ZW430863	1-45x
ZW432347	6-48
ZW432347	14-21x
ZW432944	6-8
ZW447208	4-4
ZW461610	14-30x
ZW526577	14-18
ZW548010	14-38
ZW554624	13-39
ZW554940	1-53
ZW558088	13-99x
ZW558145	13-70
ZW563218	1-94
ZW861344	6-16x

SECTION 3

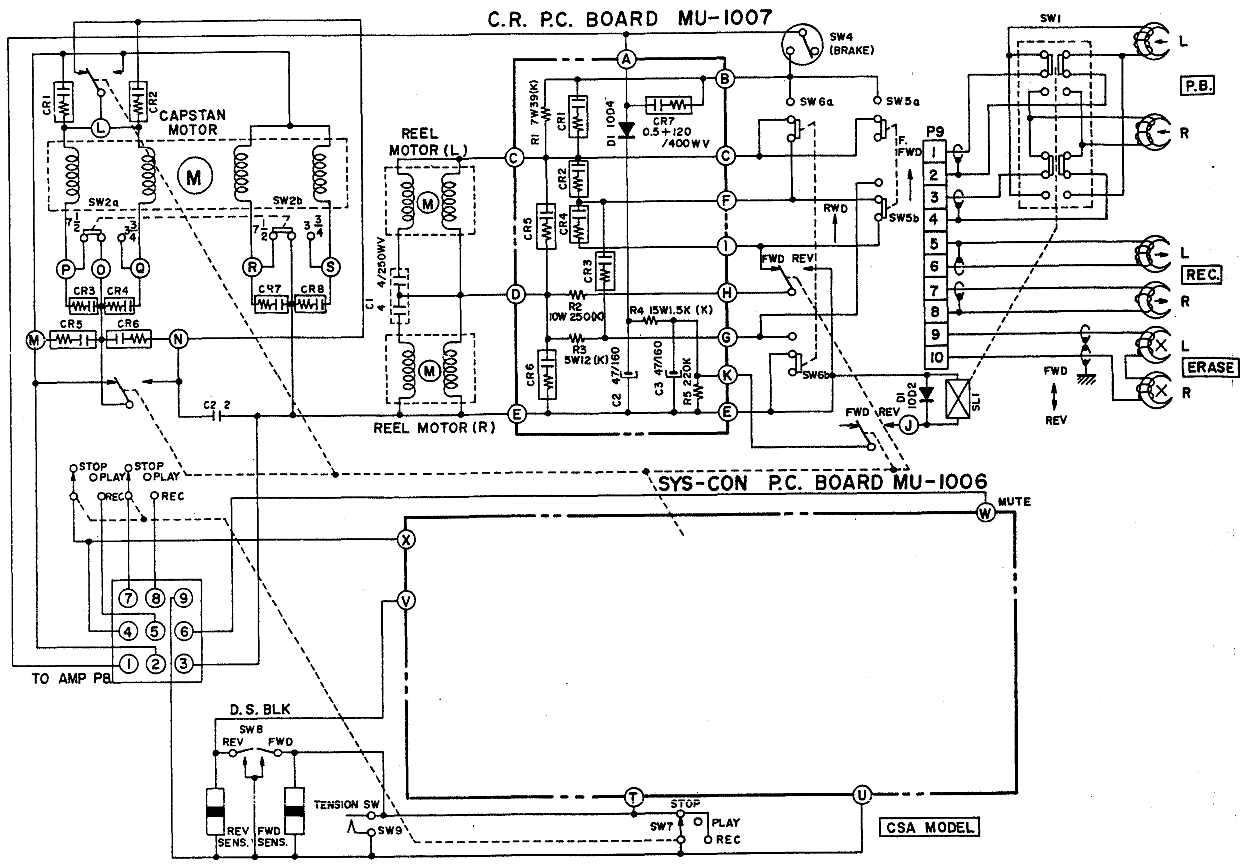
SCHEMATIC DIAGRAM

1. GX-210D SCHEMATIC DIAGRAM

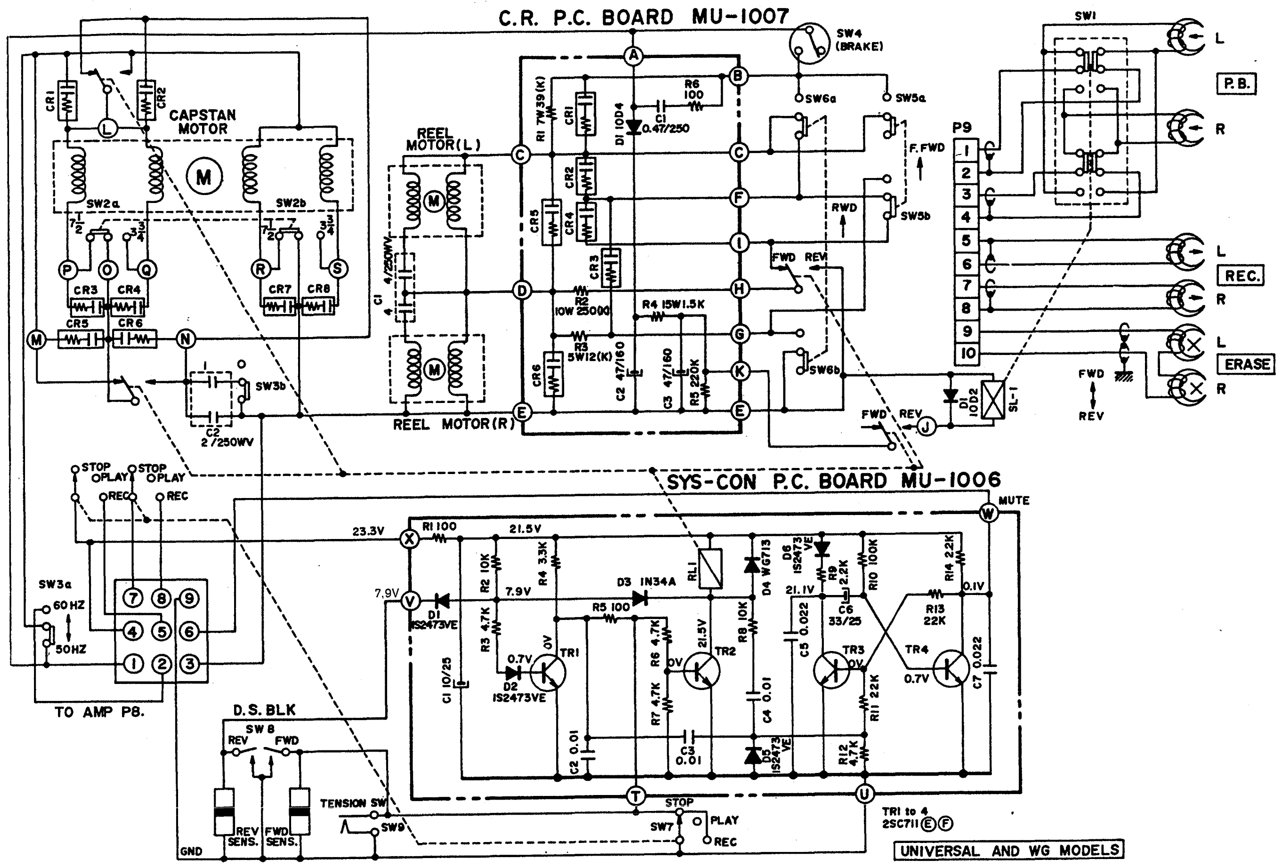

P.B. HEAD
L.CH.
R.CH.
REC. HEAD
ERASE HEAD
J9
P.B. AMP. P.C. BOARD ND-5037
TR1 to 3 2SC1312 (G)(H)
TR4 to 6 2SC711 (D)(E)
LINE OUT J4
LINE OUT J5
PHONE
M1
M2
REC. LEVEL
VR1 50KA
TAPE ← → SOURCE
MONITOR
SW1
E.Q. P.C. BOARD MU-5018
TAPE SELECTOR
NORM
SW2
S.R.T
EQUALIZER
LEFT CH.
MIC J2
LINE J5
DIN J10
HIGH
LOW
LINE J6
MIC J3
RIGHT CH.
REC. AMP. & OSC. P.C. BOARD MU-5016
TR1 to 4 2SC1312 (G)(H)
TR5 2SC711 (E)(F)
TR6,7 2SC711 (E)(F)
( ) INDICATES VOLTAGE 3¾ IPS
POWER SUPPLY P.C. BOARD MU-5017
TR1 2SD360 (D)
D1 to 4 10D05
SW3
TO REC. & P.B. AMP.
TO OSC.
FROM MECHA J8
IND1 METER LAMP
IND2 REC. LAMP
T1 MUT-2
T1 MUT-3
T1 MUT-1
CSA
CEE
POWER
A.C. 120V 60HZ
A.C. 220V 50HZ
A.C. 100 to 240V 50/60 HZ
100 to 120V 2A
200 to 240V 1A
CR1 0.033+120/250V
F1
SW4
A.C. 220V 50HZ
WG

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W (J)
ALL CAPACITORS IN μF 50W.V. (J)
POWER TRANSFORMER BLOCK IS
DIFERENT ACCORDING TO AREA SHOWN AS ABOVE

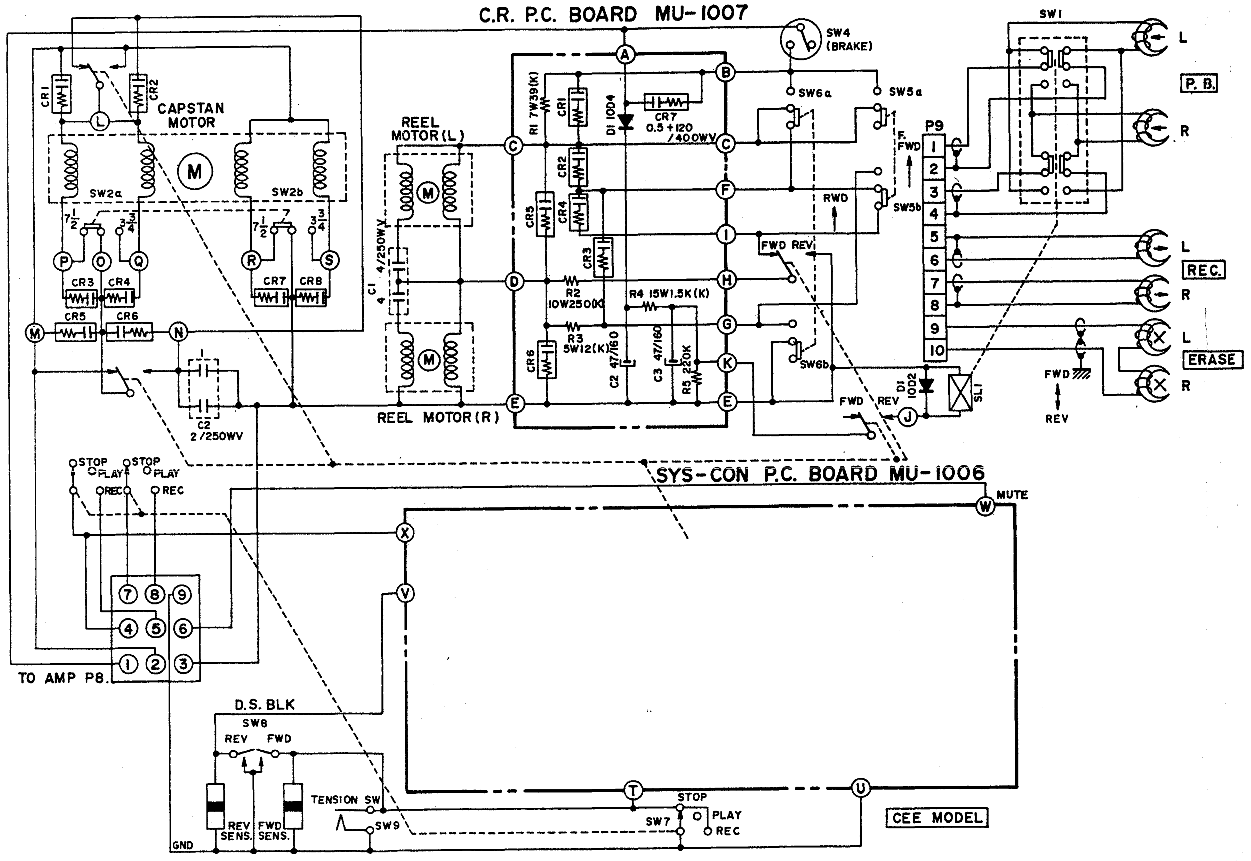
GX-210D
SCHEMATIC DIAGRAM
NO.2-1 1480234A
2C


C.R. P.C. BOARD MU-1007
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR47
CR8
CR5
CR6
C2 2
REEL MOTOR (L)
REEL MOTOR (R)
C1 4/250WV
R1 7W39(K)
D1 10D4
CR7 0.5+120 /400WV
R2 10W 250(K)
R3 5W12 (K)
R4 15W1.5K (K)
C2 47/160
C3 47/160
R5 220K
SW4 (BRAKE)
SW6a
SW5a
SW5b
SW6b
F. FWD
RWD
FWD REV
D1 10D2
SL1
P9
SW1
P.B.
REC.
ERASE
L
R
FWD
REV
SYS-CON P.C. BOARD MU-1006
MUTE
STOP PLAY
REC
TO AMP P8
D.S. BLK
SW8
REV SENS.
FWD SENS.
TENSION SW
SW9
SW7
STOP
PLAY
REC

CSA MODEL


C.R. P.C. BOARD MU-1007
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR7
CR8
CR5
CR6
SW3b
C2 2/250WV
REEL MOTOR (L)
REEL MOTOR (R)
C1 4/250WV
R1 7W39(K)
D1 10D4
R6 100
C1 0.47/250
R2 10W 250(K)
R3 5W12(K)
R4 15W1.5K
C2 47/160
C3 47/160
R5 220K
SW4 (BRAKE)
SW6a
SW5a
SW5b
SW6b
F.FWD
RWD
FWD REV
D1 10D2
SL-1
P9
SW1
P.B.
REC.
ERASE
SYS-CON P.C. BOARD MU-1006
MUTE
23.3V
R1 100
21.5V
7.9V
R2 10K
R4 3.3K
D3 1N34A
RL1
D4 WG713
D6 1S2473 VE
R9 2.2K
R10 100K
R14 2.2K
21.1V
0.1V
D1 1S2473VE
R5 100
R3 4.7K
R6 4.7K
R8 10K
C5 0.022
C6 33/25
R13 22K
0.7V
0V
TR1
TR2
TR3
TR4
C7 0.022
C1 10/25
D2 1S2473VE
R7 4.7K
C4 0.01
R11 22K
C2 0.01
C3 0.01
D5 1S2473 VE
R12 4.7K
SW3a
60 HZ
50HZ
TO AMP P8.
D.S. BLK
SW8
REV SENS.
FWD SENS.
GND
TENSION SW
SW9
SW7
STOP
PLAY
REC
TR1 to 4 2SC711 Ⓔ Ⓕ

UNIVERSAL AND WG MODELS


C.R. P.C. BOARD MU-1007
CAPSTAN MOTOR
CR1
CR2
SW2a
SW2b
CR3
CR4
CR7
CR8
CR5
CR6
C2 2/250WV
REEL MOTOR (L)
REEL MOTOR (R)
C1 4/250WV
R1 7W39(K)
D1 10D4
CR7 0.5+120 /400WV
R2 10W2500
R3 5W12(K)
R4 15W1.5K(K)
C2 47/160
C3 47/160
R5 220K
SW4 (BRAKE)
SW6a
SW5a
SW5b
SW6b
F. FWD
RWD
FWD REV
D1 10D2
SL1
P9
SW1
P.B.
REC.
ERASE
SYS-CON P.C. BOARD MU-1006
MUTE
STOP PLAY
REC
TO AMP P8.
D.S. BLK
SW8
REV
FWD
REV SENS.
FWD SENS.
GND
TENSION SW
SW9
SW7
STOP
PLAY
REC

CEE MODEL

NOTE
UNLESS OTHERWISE SPECIFIED
ALL RESISTORS IN Ω 1/4W(J)
ALL CAPACITORS IN μF 50W.V.(J)
ALL SPARK QUENCHERS IN 0.1μ + 120Ω/400W.V.
SPARK QUENCHERS CR1 to CR8 SHOWN IN
PARENTHESIS ( ) ARE LOCATED ON
SYS-CON P.C. BOARD.
MECHANISM BLOCK IS DIFFEREN
ACCORDING TO AREA.

GX-210D
SCHEMATIC DIAGRAM
NO.2-2 1480235A
2C